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SOCIAL AND BIOLOGICAL FACTORS IN INFANT MORTALITY*

VI. MOTHERS WHO HAVE THEIR BABIES IN HOSPITALS AND NURSING HOMES

BY

J. A. HEADY AND J. N. MORRIS

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Surprisingly little has been published on the subject of which women have their babies at home and which in hospital. It is, therefore, the purpose of this paper to indicate some at least of the factors which are related to the place of confinement. The relative importance of these various factors is shown; and the perinatal mortality rate is considered as a possible means of assessing whether the best use is being made of available maternity beds.

MATERIAL

The figures in this paper relate, in the main, to the 645,000 single, legitimate, live births which occurred in England and Wales in 1950. They are based on the national documents of birth registration, and were collected in the course of the Unit's joint inquiry with the General Register Office into social and biological factors in infant mortality. Data about the place of confinement for multiple and illegitimate births (some 7 per cent. of all births) are not available for the whole country, because, in the original study, the main analysis of stillbirths and infant mortality rates was limited to single, legitimate births. These exclusions will have little or no effect on the main results. In order, however, to fill the gap to some extent, data about place of confinement are included for multiple and illegitimate births in the County of London in 1949 and 1950. Data about the place of confinement for stillbirths are also not available, but, again, since stillbirths are less than 3 per cent. of all births, their exclusion will have a barely noticeable effect on the total picture of where mothers have their babies. (This has been verified for London.)

Since 1950 the overall proportion of births occurring in "Institutions" has increased slightly. In 1950 the figure was probably a shade higher than 60 per cent.†, and in 1954 it was 63·2 per cent. It is not felt that this slight difference will have materially affected the topical relevance of the data, though it is possible that within these similar total figures there may have been some change of pattern, especially since 1951, when the Ministry of Health circulated a letter to hospitals on the subject of priorities. The picture presented here relates to 1950 and the state of affairs then existing. In so far as any of the facts which emerge from this analysis may be of practical importance, they will, of course, need to be checked from more up-to-date material—which is not yet available.

Births are classified by the General Register Office into those occurring:

(*i*) In hospitals,
(*ii*) In nursing homes,
(*iii*) In mental hospitals,
(*iv*) Elsewhere.

The number classified as occurring in mental hospitals is negligible. Those classified as occurring "Elsewhere" can be regarded as occurring "At home", *i.e.* as "Domiciliary" confinements. For simplicity of analysis it seemed better to concentrate on one index, namely *the percentage of births which occurred in institutions, i.e.* in hospitals plus nursing homes. No data are generally available for the whole country on the percentage of births in each of the four categories in 1950, but, in the County of London in that year, the proportions were as follows:

(*i*) In hospitals	71 per cent.
(*ii*) In nursing homes	2 per cent.
(*iii*) In mental hospitals	0·01 per cent.
(*iv*) Elsewhere ("at home")	27 per cent.

*A series of articles reporting an inquiry made jointly by the Social Medicine Research Unit (Medical Research Council) and the General Register Office. These articles (see References) were prepared by the Unit in collaboration with the General Register Office, and have been approved for publication by the joint working party responsible for the inquiry.

†It is not possible to be more precise about the 1950 figure because of the exclusion of multiple and illegitimate births.

It can be taken that, for the country as a whole, the great majority of births occurring in "Institutions" do in fact occur in hospital. Even in London and in Social Class I, amongst whom the percentage of nursing home births might be expected to be as high as anywhere or in any class, only 16 per cent. of 1950 births occurred in nursing homes, compared with 70 per cent. in hospital.

Factors Considered

In an analysis of this kind, from official sources, it is not possible to be comprehensive and to study all possible factors which might influence the place of birth. The following are the variables which are included:

(*i*) Mother's parity*,
(*ii*) Mother's age,
(*iii*) Number of mother's previous children which she has "lost", *i.e.* those which were stillborn or have died§,
(*iv*) Father's social class,
(*v*) Region or type of area where parents lived,
(*vi*) Multiple or single birth } County of London only
(*vii*) Legitimacy }

Results

The results of the analysis (Tables I to VII) are discussed in the text. In addition, a more extensive analysis, intended mainly for those interested in detailed aspects of the problem, is given in Appendix Tables A to D. A few references are made to these Appendix Tables in the text, but, in order to save space, further comments on them are confined to notes at the foot of each, which draw attention to what are considered to be the salient points.

Table I shows the main results of the analysis for single, legitimate, live births in the whole country in 1950. 60 per cent. of all births occurred in "Institutions", the very great majority in hospital.

Parity.—Most primiparae are confined in hospital and, indeed, the national figure in 1950 was close to 80 per cent. (Column (1), Table I). Multiparae, on the other hand, were much less frequently delivered in hospital. The proportion so confined fell steeply (43 per cent. for third births and 33 per cent for the sixth to tenth child), and even this low figure was higher than that found in some special groups (mothers with more than five children in Social Class IV (29 per cent.) or in the Northern Region (25 per cent.)).

This parity pattern, or axis, dominated the picture in England and Wales in 1950, and all that follows in the present discussion depends upon it.

Mother's Age.—As Column (2) of Table I shows, the range was narrow. Almost 70 per cent. of the youngest mothers were confined in "Institutions", and almost 60 per cent. of those aged 25–29. For women of 30 years of age and over the figure was about 55 per cent. That is to say there was a definite

*The number of children she has borne—surviving, dead or still-born—including the present one.

§It should be noted that it is not possible to tell from the data (*a*) whether the "previous loss" was a stillborn or a liveborn baby, nor (*b*) if it was a live born baby, at what age it died.

However, by far the greater part of mortality in early life is within the "perinatal" period.

TABLE I

PERCENTAGE OF BIRTHS WHICH OCCURRED IN "INSTITUTIONS"*

(Single, legitimate, live births, England and Wales, 1950)

(1) Mother's Parity†		(2) Mother's Age		(3)‡ Number of Previous Children Lost		(4) Father's Social Class		(5) Region	
Parity	Per cent. in Institutions	Age (yrs)	Per cent. in Institutions	Previous Children Lost	Per cent. in Institutions	Social Class	Per cent. in Institutions	"Standard Region" where parents lived	Per cent. in Institutions
1	78	16–19	69	0	60§	I	79	London and S.E.	70
2	57	20–24	65	1	51	II	69	Wales II	
3	43	25–29	59	2	50	III	60	(North and West)	67
4	36	30–34	56	3	53	IV	51	North Western	64
5	33	35–39	55	4	53	V	53	Southern	63
6–10	33	40–44	55	5–9	41			South Western	58
11+	40	45+	56					Wales I (South)	57
								Eastern	56
								East and West Ridings	56
								North Midland	52
								Midland	51
								Northern	48
All Parities	60	All Ages	60	0–9 Children Lost	60	All Classes	60	England and Wales	60

* "Institutions" = Hospitals and Nursing Homes, the very great majority being Hospitals.
† For definitions of parity, etc.—see footnotes to text.
‡ The data in Column (3) exclude women of Parity 11 or more for whom the relevant information was not available.
§ The precise figure for women who had lost no children is, of course, different from that for all women. It appears the same when corrected to the nearest whole number.

tendency for confinement in hospital to become less common with advancing maternal age. This does not mean that no account was taken of mother's age in admission to hospital. Table II (opposite) shows that the admission rates declined simply because the older mothers tended to be those who had already borne children, and they, as has just been seen, were less likely than primiparae to have their babies in "Institutions". If attention is confined to births of a particular parity (say third births), the proportion confined in hospital did in fact increase as the mother's age increased—from 39 and 40 per cent. among mothers in their twenties, to 63 per cent. among mothers in their late forties. A better description of the real relationship between maternal age and hospital admission would therefore be that, *parity for parity*, older mothers did have their babies in "Institutions" more often than younger mothers. This increase, however, was small compared with the dominant tendency for hospitalization to be less common with increasing parity. Since a woman's age must obviously increase with her parity, the net result is that the oldest mothers who are not primiparous have, almost without exception, a far lower hospitalization rate than primiparae, old or young (the very youngest mothers form a minor exception to this trend).

TABLE II

PERCENTAGE OF BIRTHS WHICH OCCURRED IN INSTITUTIONS, BY MOTHER'S PARITY AND MOTHER'S AGE

(Single, legitimate, live births, England and Wales, 1950)

Mother's Parity	Mother's Age (yrs)							
	16–19	20–24	25–29	30–34	35–39	40–44	45+	All Ages
1	72	75	80	83	88	92	93	78
2	54	53	55	60	65	71	79	57
3	47	40	39	44	51	57	63	43
4	–*	34	31	34	41	48	49	36
5	–*	31	29	31	35	42	48	33
6–10	–*	38	29	30	32	37	46	33
11+	–*	–*	–*	40	37	42	43	40
All Parities	69	65	59	56	55	55	56	60

–* = fewer than ten institutional births.

Previous Loss of a Child.—Column (3) of Table I shows how the proportion of births occurring in "Institutions" varied with the number of previous children a mother had lost. Women who had lost previous children had their babies in institutions *less* frequently (53–41 per cent.) than women who had not (60 per cent.). Once more, however, these simple figures may be misleading if it is inferred that *no* account was taken of the loss of previous children in hospital admission policy. Closer scrutiny (Table III) shows that, if attention is confined to a single parity, the picture is different. Amongst women having their third child, for instance, the percentage of births occurring in "Institutions" was greater for those who had lost one previous child than for those who had not, and greater again for those who had lost two children. *Parity for parity*, then, women who had lost children did have their babies in "Institutions" more frequently than women who had not. But this effect again, is less, and usually much less, than the general trend for hospital confinement to be less common after the birth of the first child. Since, by definition, women who had already lost a child are not primiparous, the net result is, again, that mothers who had lost a child were delivered in hospitals less often than those who had no such misfortune.

TABLE III

PERCENTAGE OF BIRTHS WHICH OCCURRED IN INSTITUTIONS*, BY MOTHER'S PARITY AND NUMBER OF PREVIOUS CHILDREN LOST

(Single. legitimate, live births, England and Wales, 1950)

Mother's Parity	Number of Previous Children Lost					
	0	1	2	3	4	5–9
1	78					
2	56	73				
3	42	53	70			
4	34	40	56	67		
5	30	36	47	64	51	
6–10	30	33	39	46	53	41
1–10	60	51	50	53	53	41

* Women of Parity 11 or more are excluded from this Table because the relevant information was not available for them.

Social Class.—Column (4) of Table I shows a quite considerable variation with social class. The percentage of births occurring in institutions was highest at 79 per cent. in Social Class I and fell steadily to 51 per cent. in Social Class IV with a slight rise to 53 per cent. in Social Class V. Table IV (overleaf) shows that the proportion was high for Social Class I and low for Social Classes IV and V whatever the mother's parity. Moreover, as expected, first births were much more likely to occur in institutions than second (90–71 per cent. compared with 76–49 per cent.), second births more likely than third (67–37 per cent.) and so on, whatever the mother's social class. In other words, social class, unlike mother's age and the loss of previous children, appeared to be related to hospital admission independently of the mother's parity. That is to say differences between classes cannot be explained by

the fact that well-to-do families are smaller on the average, for the same class differences are apparent for families of equal size.

TABLE IV

PERCENTAGE OF BIRTHS WHICH OCCURRED IN INSTITUTIONS, BY MOTHER'S PARITY AND FATHER'S SOCIAL CLASS

(Single, legitimate, live births, England and Wales, 1950)

Mother's Parity	Father's Social Class					
	I	II	III	IV	V	All Classes
1	90	84	78	71	75	78
2	76	66	56	49	52	57
3	67	55	42	37	40	43
4	62	47	35	29	33	36
5	54	44	32	30	33	33
6–10	39	35	33	29	34	33
11+	–*	39	40	41	39	40
All Parities	79	69	60	51	53	60

–* = Fewer than ten institutional births.

Region where Parents Lived.—Fig. 1, corresponding to Column (5) of Table I, shows how much a woman's chance of being confined in hospital varied according to where she lived, from 70 per cent. in London and the South-East of England, to 48 per cent. in the Northern Region. The "Regions" shown are the "Standard Regions" commonly used by the Registrar-General*. Each includes a large part of the country within which there is room for much local variation. The true range was, therefore, probably greater than that shown in the Table. Equally it is possible that in some parts of the north, in spite of these figures, a higher proportion of women had their babies in institutions than in some parts of the South-East of England. From Fig. 1 it is apparent that there was no very obvious geographical pattern—certainly no clear North—South trend, though the extremes were found in the North and South. Appendix Table A shows, as might be expected, that institutional confinement was less common in rural areas than in urban areas, and commonest in the large centres of population or "conurbations", though there was considerable variation between such centres.

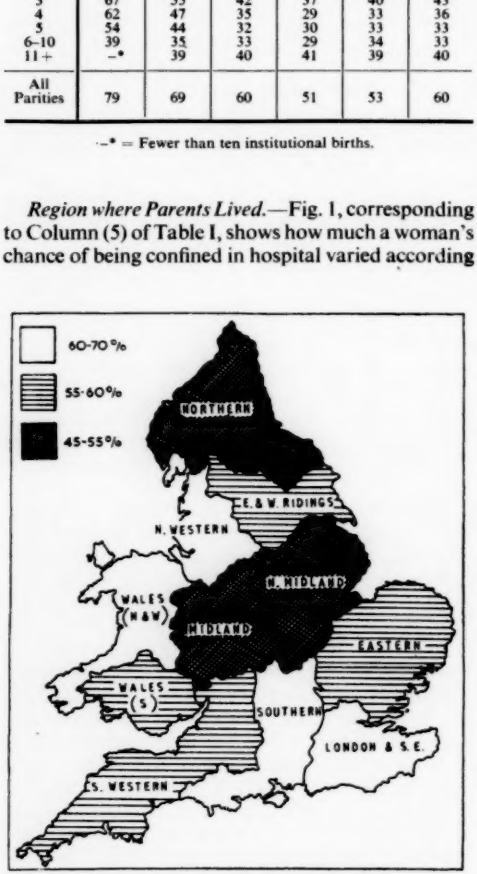

FIG. 1.—Regional variation in proportion of single, legitimate, live births occurring in "Institutions" (England and Wales, 1950).

Table V (opposite) shows how, once again, the parity pattern is dominant inside the Regions. The range for primiparae is between 87 and 65 per cent. confinement in hospital, with a steep decline to 67–46 per cent. for the second birth, and to 44–25 per cent. for the sixth to tenth birth. The same pattern is evident within each region. The Northern Region, which had the lowest overall rate (48 per cent.), had a range from 65 per cent. in first births to 25 per cent. in sixth to tenth births. London and the South-East with the highest overall rate (70 per cent.), shows a range from 87 per cent. in first births to 41 per cent. in sixth to tenth births. Whatever the total hospitalization rate may be, and this will reflect the actual number of beds available and usable, the disposition of these beds is apparently largely determined by the principle that primiparae should if possible be delivered in hospital.

To sum up the main features of Tables I to V: in 1950 there were in different parts of the country and among women classified by different biological and social attributes, large variations in the proportion of mothers whose confinement occurred in hospitals and nursing homes. What has been called the parity effect was dominant—first births more commonly occurred in "Institutions" than later births, and this trend was progressive until about Parity 10. Hospital confinement was commonest in London and the South-East, and least common in the North; it was commoner among young women than older women; among women who had lost no children than among

* A definition of "Standard Regions" is given in the Registrar-General's "Statistical Review for England and Wales".

TABLE V

PERCENTAGE OF BIRTHS WHICH OCCURRED IN INSTITUTIONS, BY MOTHER'S PARITY AND "STANDARD REGION" IN WHICH PARENTS LIVED

(Single, legitimate, live births, England and Wales, 1950)

Mother's Parity	"Standard" Region in which Parents Lived											England and Wales
	Northern	East and West Ridings	North Western	North Midland	Midland	Eastern	London and S. East	Southern	South Western	Wales I (South)	Wales II (N. and West)	
1	65	76	84	72	70	74	87	80	75	72	83	78
2	46	51	60	48	49	53	66	61	55	57	67	57
3	34	40	47	35	36	40	52	49	43	45	54	43
4	26	33	39	29	28	35	45	39	37	34	43	36
5	26	32	36	29	26	32	41	38	33	29	42	33
6–10	25	29	36	30	25	33	41	35	36	28	44	33
11+	41	44	44	37	37	40	44	36	43	28	32	40
All Parities	48	56	64	52	51	56	70	63	58	57	67	60

women who had, and among women in Social Class I than among women in Social Classes IV and V.

Parity for parity, the older mothers were hospitalized more commonly than young mothers, and women who had lost a child more commonly than those who had not; but, since mothers who had already lost a child were by definition not primiparae and older mothers also tended not to be so, the higher hospitalization rate of such women was relatively a minor matter compared with the dominant trend for hospitalization to be high in primiparae and lower, often much lower, at other parities. So much so that the net result was that mothers in their 40s (who were not primiparae), and women who had lost a previous child, were in fact delivered in "Institutions" less commonly than the national average, which, in large measure, reflected the high rate among primiparae.

Multiple and Illegitimate Births in London.—To present a more complete picture, the proportions of multiple and illegitimate births in the County of London in 1949 and 1950 which occurred in hospitals and nursing homes are shown in Table VI.

TABLE VI

MULTIPLE AND ILLEGITIMATE BIRTHS

(Live births in the County of London, 1949–50)

Plurality		Legitimacy	
Birth	Per cent. in Institutions	Legitimacy	Per cent. in Institutions
Single ..	71	Legitimate	71
Multiple ..	85	Illegitimate	78
All London Births ..	72	All London Births ..	72

In London multiple births were more likely than single, and illegitimate births more likely than legitimate, to occur in "Institutions". The difference between legitimate and illegitimate births was, in fact (though this is not shown) apparent at each maternal age (except for the very few births to mothers aged 44 and over). No data are available about the parity of mothers of illegitimate children.

COMPARISON WITH PERINATAL MORTALITY RATES

A direct comparison of the safety to mother and child in hospital delivery as opposed to domiciliary confinement, as at present organized, is vitiated because known difficult cases are normally booked for hospital and emergencies are rushed there. In fact, in any such comparisons, it is usual for the death rates to be higher in hospital than at home, though no informed person would adduce this particular fact as evidence that it is more dangerous to have a baby in hospital. On the contrary, in the present circumstances, there would be general agreement that, from a medical point of view, obstetrical cases which are likely to have material complications should be delivered in hospital.

Following this line of thought, the available evidence has been examined to see whether maternity beds are, in fact, occupied by the women who would most benefit from hospital confinement. In so doing the assumption is made that groups of women whose babies are subject to a high "perinatal" mortality rate—that is to say those who are more than usually likely to lose a baby by stillbirth or death in the first week—would benefit from hospital confinement.

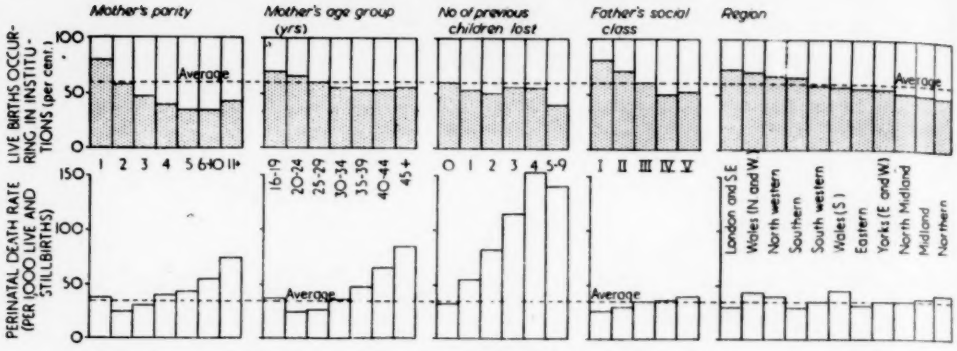

FIG. 2.—Comparison of proportion of births occurring in "Institutions" with perinatal mortality rates (single, legitimate births, England and Wales, 1950).

The results in Tables I and VI are, therefore, compared in Figs 2 and 3 with the perinatal mortality rates classified in the same way. For instance, the proportion of women in Social Class V who have babies in "Institutions" is compared with the mortality rate for their babies. It is thus possible to see whether, from the point of view of social class, the women with the highest rates are those who most frequently have their babies in hospital. Similar comparisons can be made from the point of view of the other factors considered here—parity, maternal age, the loss of previous children, region of parents' home, multiple birth, and illegitimacy.

It will be seen that the proportion of births occurring in "Institutions" conforms only in part with the risk of foetal or early infant death. In terms of parity the high mortality for the later births in large families (largely a function of maternal age, of course) is not matched by a correspondingly high admission rate to hospitals and nursing homes. This proportion decreases with increasing maternal age, and women who have lost children have a lower admission rate than those who have not. Mortality rates increase as social class declines from I to V; admission rates decrease from Social Class I to IV and V.

In London the overall percentage of institutional confinements is high at 72 per cent. and there is less scope for increase. There is, however, a considerable increase for multiple births (which, of course, carry one of the highest perinatal risks) and a rather smaller one for illegitimate births corresponding to a much smaller increase in the risk. (The reason for admission of mothers of illegitimate babies may, of course, have little to do with the risk of death).

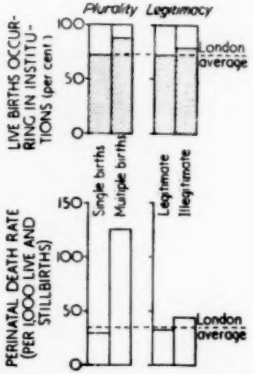

FIG. 3.—Comparison of proportion of births occurring in "Institutions" with perinatal mortality rates (County of London, 1949–50).

Approaching the problem from the opposite point of view, four "vulnerable" or "high-risk" groups of women have been defined whose children are subject to high perinatal mortality rates (Table VII, opposite). These four high-risk groups divide themselves naturally into two groups of two each, according to whether, in 1950, a higher than average or a lower than average proportion of the women concerned had their babies in institutions.

"Elderly primiparae", then, and, probably to a less extent, women expecting multiple births, did have their babies in institutions much more frequently than the average. Two groups of multiparae, on the

TABLE VII

PERINATAL MORTALITY AND PERCENTAGE OF BIRTHS IN INSTITUTIONS FOR VULNERABLE GROUPS

(England and Wales)

Proportion of Births in Institutions	Vulnerable Group	Perinatal Mortality* Rate, 1950	Percentage of Live Births in Institutions, 1950
Higher than Average	(*i*) Primiparae aged 35 or more (single, legitimate)	72	88
	(*ii*) Women with twin and other multiple pregnancies	131	85†
Lower than Average	(*iii*) Multiparae aged 40 or more (single, legitimate)	65	49
	(*iv*) Multiparae who had lost a previous child (single, legitimate)	62	51
All single, legitimate births		34	60

* Perinatal mortality = stillbirths and deaths in the first week of life, per 1,000 live and stillbirths.

† London births (1949 and 1950)

other hand, whose babies are subject to a high perinatal mortality rate, those aged 40 years or more and any who had lost previous children (whether they were aged under or over 40), had their babies in institutions *less* frequently than the average.

DISCUSSION

Figures have been given which show how certain factors appeared to influence the place of confinement for mothers in England and Wales in 1950. These figures have been compared with the perinatal mortality rates for the same mothers as a possible index of the degree to which they might have benefited from institutional confinement. Four "vulnerable" groups of mothers whose babies were subject to twice or nearly twice the average risk have been defined. The admission rates by no means corresponded to the mortality rates, and, of the four "vulnerable" groups, there were only two where more than the average number of mothers had their babies in institutions; in the other two less than the average number had their babies in hospital.

It is realized of course that the decision whether a mother has her baby in hospital or not is subject to many influences. The mother herself, her medical adviser, the ante-natal clinic, and the hospital all enter into it. The home commitments of multiparae must be important, and it is clearly significant that the two "vulnerable" groups who had a low admission rate consisted of multiparae.

Nor must it be assumed too readily that the perinatal mortality rate is the best index of the success or otherwise of the complicated process which finally decides which women should occupy a given number of beds. It does not necessarily follow that, because the perinatal mortality rate is high, women would do better in hospital. Or, again, it may be true that, although the admission rate for an entire group of women may have been low, the minority amongst the group who were most exposed to the high risk may nevertheless have been confined in hospital, without appreciably increasing the admission rate for the whole group. This point cannot be examined by using the data available here.

There are also other factors to be considered. The risk to the mother herself is, of course, a paramount consideration, but the maternal mortality rate is now so low, and the risk to mother and child is so often associated, that there need be no conflict here. Some form of morbidity index for both mother and child might be used, but, however desirable, a satisfactory one has yet to be devised. Nor is it only a question of mortality and morbidity. There are also a host of intangibles which are not necessarily unimportant because they are difficult to measure. Such are: the fact that a first birth is a "trial run" and that in subsequent births there is experience to help form an opinion; the dislocation of the household, for example, the possibly adverse emotional effect of the mother's absence on the other children; the difficulty of maintaining unified medical supervision throughout pregnancy, childbirth, and early infancy unless the birth occurs at home under the general supervision of the family doctor; the freedom from the responsibility of household management which hospital provides for a busy mother, and so on. These are imponderables, and opinion will no doubt continue to differ. Meanwhile Fig. 2 offers comparisons between the recent practice of hospital admission in England and Wales and one index of its success. It shows that, in 1950, there were groups of women whose babies were subject to relatively high risks but who were less likely than the average to have their babies in hospital.

In numerical terms it would be practical for all mothers in the four vulnerable groups to have their babies in hospital. They constitute about 15 per cent of all mothers having babies in a particular period (though contributing twice as many of the perinatal deaths); and since about two-thirds of them did have their babies in hospital in 1950, it would have meant adding some 7 or 8 per cent. to the

existing number of maternity beds, or nearer 1 per cent. to the *total* of hospital beds, to have included them all without excluding anyone else.

Summary

Of the single, legitimate babies born alive in 1950 in England and Wales, 60 per cent. were born in hospitals or nursing homes (the very great majority in hospitals). The proportion ranged from 48 per cent. in the Northern Region to 70 per cent. in London and the South-East; and from 51 per cent. in Social Class IV to 79 per cent. in Social Class I. The main factor, however, in all classes and in all parts of the country, was the parity of the mother. About 80 per cent. of primiparae were confined in hospital and the proportion fell steeply to 43 per cent. for third children and to 33 per cent. for sixth to tenth children. Older mothers had their babies in hospital less often than younger mothers, and women who had lost a previous child or children less often than those who had not. This was mainly because the older mothers were usually multiparae, as, by definition, were mothers who had lost previous children.

Admission rates were compared with perinatal mortality rates for 1950 and large discrepancies were found between them. In particular, multiparae who were aged 40 or over and women who had lost previous children were subject to twice the perinatal mortality of other mothers; but they had their babies in hospital less often than the average.

We are grateful to the staff of the General Register Office for professional, technical, and computing help; to friends and colleagues for criticism and advice; and to the staff of the Social Medicine Research Unit for much work, in particular to Mrs. I. R. Murray (secretary) and Mrs. V. P. Hall (computer).

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APPENDIX TABLES

All the tables in this appendix refer to single, legitimate, live births in England and Wales in 1950.
– = number of institutional births less than ten. Definitions given in footnotes to text.

Appendix Table A

PERCENTAGE OF BIRTHS WHICH OCCURRED IN INSTITUTIONS, BY MOTHER'S PARITY IN CONURBATIONS AND OTHER AREAS

Mother's Parity			1	2	3	4	5	6–10	11+	All Parities
Conurbations	Greater London		90	69	54	47	43	44	51	72
	S. E. Lancs. (*i.e.* Manchester)		87	57	43	35	33	34	38	64
	West Midland (*i.e.* Birmingham)		70	48	34	26	23	23	42	50
	West Yorkshire (*i.e.* Leeds, Bradford, etc.)		86	62	50	42	38	34	48	67
	Merseyside		88	70	56	47	42	42	50	69
	Tyneside		66	45	33	24	23	24	50	47
	All Conurbations		85	63	48	40	36	36	47	66
Density Aggregates	Urban Areas with Population	Over 100,000	76	52	38	30	29	31	38	56
		50,000–100,000	79	60	44	36	35	33	43	61
		Under 50,000	73	55	42	34	31	29	33	56
	Rural Areas		70	50	41	35	32	31	37	53
England and Wales			78	57	43	36	33	33	40	60

Notes (*a*) Range of variation from 23 for Parity 5–10 in Birmingham and Parity 5 on Tyneside to 90 for Parity 1 in London.
(*b*) Uniformity of variation with Parity in each area—high for first births and declining to a low figure at high parities.
(*c*) Relatively low figure for Rural Areas compared with Conurbations.

Appendix Table B

PERCENTAGE OF BIRTHS WHICH OCCURRED IN INSTITUTIONS, BY FATHER'S MOTHER'S PARITY AND MOTHER'S AGE IN DIFFERENT AREAS

Mother's Age (yrs)		Under 25					25–29					30 and Over				
Mother's Parity		1	2 and 3	4 and 5	6+	All Parities	1	2 and 3	4 and 5	6+	All Parities	1	2 and 3	4 and 5	6+	All Parities
Standard Regions	Northern	60	39	25	–	52	69	40	23	24	47	75	46	28	26	44
	East and West Ridings	72	46	33	–	63	78	45	29	24	55	83	51	35	31	51
	North Western	82	54	36	–	72	84	53	34	31	62	88	59	40	37	57
	North Midland	69	44	31	–	59	74	42	27	28	51	79	46	29	31	46
	Midland	66	45	27	–	59	72	42	24	26	51	79	46	28	25	45
	Eastern	70	46	36	–	61	76	48	29	28	56	81	51	36	34	52
	London and S.E.	85	59	40	–	76	88	59	38	33	69	91	66	46	42	66
	Southern	77	54	26	–	68	82	55	31	33	62	86	62	43	36	60
	South Western	72	49	37	–	63	76	48	30	34	56	83	55	38	36	55
	Wales I (South)	68	49	32	–	61	75	53	27	21	57	81	56	36	29	52
	Wales II (North and West)	80	58	37	–	71	85	61	34	32	66	88	67	46	44	64
Conurbations	Greater London	88	61	41	–	79	90	62	41	35	71	93	67	48	45	69
	S.E. Lancs.	85	48	24	–	72	88	50	30	26	62	91	57	37	35	58
	West Midland	66	45	27	–	59	73	41	23	22	50	80	44	26	24	43
	West Yorkshire	84	55	37	–	74	86	56	37	30	66	90	62	42	35	61
	Merseyside	87	65	49	–	78	89	63	41	36	68	92	67	47	43	61
	Tyneside	61	35	22	–	51	70	39	21	28	48	78	46	25	26	44
	All Conurbations	82	55	36	48	73	86	56	34	30	65	90	61	41	37	61
Density Aggregates	Urban: Over 100,000	73	46	27	42	63	78	45	24	28	54	83	50	32	32	50
	Urban: 50,000–100,000	76	56	37	–	69	81	52	30	35	60	86	57	38	34	56
	Urban: Under 50,000	70	47	31	–	61	76	48	29	26	56	81	54	35	30	52
	Rural	65	44	35	–	57	72	45	29	28	52	79	51	36	32	51

Notes (*a*) Range of variation from 21 for mothers aged 25–29 having their sixth and later children in South Wales, or having their fourth or fifth child on Tyneside, to 93 for mothers aged 30 and over having their first birth in London.

(*b*) Uniformity of variation with Mother's Age and Parity in each area, high for first births and declining steadily with increasing family size in each area at each age.

Appendix Table C

PERCENTAGE OF BIRTHS WHICH OCCURRED IN INSTITUTIONS, BY FATHER'S SOCIAL CLASS IN DIFFERENT AREAS

Social Class		I	II	III	IV	V	All Classes
Standard Regions	Northern	77	63	48	40	40	48
	East and West Ridings	75	68	56	50	50	56
	North Western	80	73	65	56	57	64
	North Midland	72	61	52	44	50	52
	Midland	73	64	50	46	46	51
	Eastern	75	63	56	48	50	56
	London and S.E.	82	76	70	63	62	70
	Southern	83	71	63	55	53	63
	South Western	76	66	58	50	51	58
	Wales I (South)	76	67	57	50	50	57
	Wales II (North and West)	83	72	68	61	57	67
Conurbations	Greater London	83	78	72	67	66	72
	S.E. Lancs.	83	77	64	57	55	64
	West Midland	73	65	49	46	45	50
	West Yorkshire	75	74	66	63	63	67
	Merseyside	84	78	71	63	61	69
	Tyneside	77	65	48	39	37	47
	All Conurbations	82	76	65	59	59	66
Density Aggregates	Urban: Over 100,000	78	67	56	50	47	56
	Urban: 50,000–100,000	83	72	61	55	53	61
	Urban: Under 50,000	76	68	56	48	50	56
	Rural	74	61	53	45	48	53
England and Wales		79	69	60	51	53	60

Notes (*a*) Range of variation with Social Class is less than that with Parity.

(*b*) This is mainly because the lowest percentages (in Social Classes IV and V) are not so low as those amongst the high parities.

(*c*) Uniformity of variation with Social Class in each area—high for Social Class I and declining steadily to a relatively low figure in Social Classes IV and V.

Appendix Table D

PERCENTAGE OF BIRTHS WHICH OCCURRED IN INSTITUTIONS, BY MOTHER'S PARITY AND FATHER'S SOCIAL CLASS IN DIFFERENT AREAS

Social Class		I and II					III					IV and V				
Mother's Parity		1	2 and 3	4 and 5	6+	All Parities	1	2 and 3	4 and 5	6+	All Parities	1	2 and 3	4 and 5	6+	All Parities
Standard Regions	Northern	78	60	45	33	65	65	41	25	25	48	58	36	24	26	40
	East and West Ridings	85	61	44	33	69	76	47	33	29	56	70	43	31	31	50
	North Western	87	68	54	37	74	84	55	38	38	65	81	50	34	36	56
	North Midland	79	56	42	36	63	72	43	27	30	52	67	39	27	29	46
	Midland	80	59	39	29	64	69	42	26	25	50	66	40	25	27	46
	Eastern	81	59	44	33	65	74	48	33	35	56	68	42	31	33	49
	London and S.E.	91	71	55	38	78	87	61	43	42	70	83	55	39	41	62
	Southern	88	70	56	34	75	80	56	37	36	63	73	49	32	35	54
	South Western	80	62	49	43	68	75	50	34	36	58	71	44	31	35	50
	Wales I (South)	82	64	40	26	69	72	54	33	31	57	67	47	30	26	50
	Wales II (North and West)	87	72	48	47	74	83	63	45	44	68	81	56	36	41	60
Conurbations	Greater London	92	73	57	42	80	89	63	44	44	72	87	58	43	45	66
	S.E. Lancs.	91	71	54	43	78	87	51	34	35	64	85	45	30	33	56
	West Midland	82	58	37	31	67	69	41	24	23	49	67	40	24	26	46
	West Yorkshire	89	66	49	33	74	85	57	40	31	66	84	56	39	39	63
	Merseyside	91	76	60	41	79	89	66	47	45	71	87	59	41	41	62
	Tyneside	82	61	43	–	68	67	40	22	28	48	56	35	23	25	38
	All Conurbations	90	70	53	40	77	84	56	38	36	65	82	52	35	37	59
Density Aggregates	Urban Over 100,000	84	62	42	34	69	76	46	29	30	56	71	41	27	32	49
	Urban 50,000–100,000	87	67	56	44	74	79	54	35	35	61	75	49	32	32	54
	Urban Under 50,000	82	64	49	34	70	73	49	33	30	56	67	44	28	29	49
	Rural	78	59	46	34	64	69	46	32	33	53	63	39	29	30	46

Notes (*a*) Range of variation from 22 for mothers in Social Class III having their fourth and fifth children on Tyneside to 92 for mothers in Social Classes I and II having their first babies in London.

(*b*) Uniformity of variation with Parity in each Social Class and each Area—high for first births followed by a steady decline.

(*c*) Uniformity of variation with Social Class at each Parity and in each Area—high for Social Classes I and II and low for Social Classes IV and V.

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SCHIZOPHRENIA
A PROGNOSTIC AND SOCIAL STUDY

BY

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INTRODUCTION

This paper reports the findings of a follow-up study of 126 schizophrenic in-patients who received insulin coma therapy at the Maudsley Hospital during the years 1945—1948 inclusive, these appearing to be a representative group with a reasonably favourable outlook. The case papers relating to these patients gave detailed information about their medical history and in-patient care at this hospital. The individual patients were followed up for 5 years after discharge from the Maudsley Hospital, strenuous efforts being made to obtain complete information about their fate during this period. Many of the patients (38 per cent.) and their relatives (58 per cent.) were interviewed by the two clinicians (A. H. and M. S.) and/or the psychiatric social worker (I. L.). Medical reports relating to part or all of the follow-up period were available for 86 per cent. Only four patients and ten relatives refused an interview, usually on the grounds that the psychotic episode was over and they were unwilling to raise the matter again. In four cases contact with the patients or relatives could only be made by letter. A social case history and a medical report were obtained for those persons who were found to be in hospital. Two died early in the follow-up period and for one an assessment of the clinical state was not available. Numbers in some of the Tables therefore amount to only 123.

RELATION OF TIME SPENT IN HOSPITAL DURING 5-YEAR PERIOD TO OUTCOME AS OBSERVED AT THE END OF 5 YEARS.—Statistical studies in which the duration of stay in hospital is used as an index are common, *e.g.* Fuller and Johnston (1931), Malzberg (1940), Dunham and Meltzer (1946), Harris and Lubin (1952), Harris and Norris (1954; 1955), and Ødegaard (1954), to mention but a few from both sides of the Atlantic. The results are often criticized on the grounds that a person may be out of hospital but yet show marked mental symptoms. This is of course true, but does not necessarily conflict with the hypothesis implicit in such studies that the length of time in hospital during a specified period is a measure of the intractability or persistence of the illness and that persons who suffered from milder or briefer attacks are less likely to have residual disabilities.

It was possible in this study to measure the course of illness by three indices:

(1) Total time spent in hospital during 5 years follow-up;

(2) Clinical condition of patient at the end of 5 years, *i.e.* whether recovered, showing residual defect or mild psychotic symptoms, unchanged, or worse;

(3) Social condition at the end of 5 years, as indicated by independent life, dependence on others although out of hospital, or in-patient residence.

Thus each individual patient was scored in three ways, and we examined the data (Table I) to see if the three indices gave similar assessments. It should be noted here that, whereas duration of stay in hospital and social independence were items which could be more or less objectively rated independently of each other, the clinical assessment of recovery was subjective and the assessors' ratings must have been influenced by knowledge of the patient's social adaptation. In short, we found that, of those patients who did not experience any hospital care during the follow-up period, 73·6 per cent. were rated clinically as recovered or improved and socially as independent. Of persons who spent a total of less than one year in hospital, 67·8 per cent. were recovered or improved and independent and 9·7 per cent. were in hospital. Of those who spent more than one year in hospital, only 15·5 per cent. were rated clinically as recovered or improved and socially independent whereas 67 per cent. were in hospital. These differences, shown in detail in Table I, were highly significant, and the probability that they resulted from chance effects alone is less than 1 in 10,000.

TABLE I

COMPARISON OF LENGTH OF STAY IN HOSPITAL DURING FOLLOW-UP PERIOD WITH CLINICAL AND SOCIAL ASSESSMENT OF PATIENTS' OUTCOME

Assessment at End of Follow-up		Hospital Care experienced during follow-up period						Totals		
		None		Less than One Year		One Year or More				
Social	Clinical	No.	%	No.	%	No.	%	No.	% in each "Social" Group	% of all Patients
Independent	Recovered	16	47·1	11	35·5	6	10·3	33	54·1	26·8
	Improved	9	26·5	10	32·3	3	5·2	22	36·1	17·9
	Unchanged or Worse	2	5·9	3	9·7	1	1·7	6	9·8	4·9
	Total	27	79·4	24	77·4	10	17·2	61	100·0	49·6
Dependent	Recovered	1	2·9	1	3·2	1	1·7	3	15·0	2·4
	Improved	6	17·6	1	3·2	5	8·6	12	60·0	9·8
	Unchanged or Worse	–	–	2	6·5	3	5·2	5	25·0	4·1
	Total	7	20·6	4	12·9	9	15·5	20	100·0	16·3
Hospital In-Patient	Recovered	–	–	–	–	1	1·7	1	2·4	0·8
	Improved	–	–	–	–	4	6·9	4	9·5	3·3
	Unchanged or Worse	–	–	3	9·7	34	58·6	37	88·1	30·1
	Total	–	–	3	9·7	39	67·2	42	100·0	34·1
All Persons		34	100·0	31	100·0	58	99·9	123		100·0

χ^2 Significance Tests, in each case using the three Length-of-Stay Groups and:

(*a*) three Social Outcome Groups $\chi^2 = 59{\cdot}4$; $n = 4$; $P < 0{\cdot}001$
(*b*) nine Assessment Groups $\chi^2 = 66{\cdot}4$; $n = 16$; $P < 0{\cdot}001$
(*c*) three Clinical Outcome Groups $\chi^2 = 35{\cdot}9$; $n = 4$; $P < 0{\cdot}001$

It seems justifiable to conclude, therefore, that large-scale statistical studies, in which prognosis is assessed solely by duration of hospital stay, do, in fact, give a reliable assessment of outcome. The results of this detailed study confirmed those found previously by Harris and Norris (1954; 1955). Age and sex had no marked influence on outcome. The numbers of patients in the diagnostic sub-groups here were as follows:

Simple, 14;
Paranoid, 52;
Hebephrenic, 31;
Catatonic, 9;
Atypical, 20.

The outcome in the atypical group was somewhat superior to that in the others but not to a statistically significant extent. Investigation of the individual signs according to a plan used previously by Harris and Norris (1954) confirmed the finding that deterioration of affect was the only prognostic indicator of importance (Table II, opposite). Deterioration of affect was more commonly found among the long-stay cases than among others, and was more often associated with marked evidence of psychosis at the end of the follow-up period. Persons exhibiting this sign were not often found to be socially independent.

EFFECT OF CERTAIN FEATURES OF TREATMENT ON OUTCOME.—The number of comas and the insulin dosage were obtained from the case records and are shown in Table III (opposite). No association could be demonstrated between the outcome and the number of comas, insulin dosage, or gain in weight during treatment, all of which have been thought at times to be of some prognostic importance (Mayer-Gross, Slater, and Roth, 1954). This finding is of little significance, since there are so many other variables which cannot be accounted for.

EFFECT OF SOCIAL FACTORS ON OUTCOME.—Previous work on this subject is scanty. Mettler, Crandell, Wittenborn, Litten, Feiring, and Carpenter (1954), in an inquiry into the fate of psychotic patients subjected to leucotomy or similar procedures, assessed their subjects on the Crutcher environmental rating scale and compared the ratings with outcome. They concluded that "while a favourable environmental rating is no guarantee of discharge, an unfavourable one tends to militate against it". Orr, Anderson, Martin, and Philpot (1955) found that "possession of immediate family" influenced the chance of discharge favourably. Hollingshead and Redlich (1954a, b) found that, on the average, upper class patients spent less total time

TABLE II

OUTCOME OF PERSONS WITH DETERIORATION OF AFFECT COMPARED WITH THAT OF PERSONS NOT SHOWING THIS SIGN

Prognostic Indices		Deterioration of Affect: Present Observed	Present Expected	Absent Observed	Absent Expected	Statistical Significance
Time in Hospital during Follow-up Period (yrs)	None	6	13·2	28	20·8	Degrees of Freedom = 3 $\chi^2 = 13{\cdot}1$ $P < 0{\cdot}005$
	Less than 1	11	12·0	20	19·0	
	1–2	9	8·5	13	13·5	
	2 and over	22	14·3	15	22·7	
	All	48	48·0	76	76·0	
Clinical Status	Recovered	4	14·4	33	22·6	Degrees of Freedom = 4 $\chi^2 = 17{\cdot}9$ $P < 0{\cdot}005$
	Residual Defect	10	7·4	9	11·6	
	Mild Psychotic Symptoms	8	7·4	11	11·6	
	No Change	15	9·4	9	14·6	
	Worse	11	9·4	13	14·6	
	All	48	48·0	75*	75·0	
Social Status	Independent	13	24·0	49	38·0	Degrees of Freedom = 2 $\chi^2 = 17{\cdot}4$ $P < 0{\cdot}0001$
	Dependent but out of Hospital	13	7·7	7	12·3	
	Hospital Patient	22	16·3	20	25·7	
	All	48	48·0	76	76·0	

* For one patient no information was available on this point

TABLE III

INSULIN TREATMENT GIVEN TO PATIENTS INCLUDED IN THIS STUDY

Comas		Number of Patients	Percentage
Number of Comas Received	Under 20	45	36·3
	20–29	25	20·2
	30–39	34	27·4
	40 and over	20	16·1
	All Patients	124	100·0
Maximum Dosage of Insulin Required to induce Coma (units)	Under 200	23	19·8
	200–299	27	23·4
	300–399	28	24·1
	400–499	20	17·2
	500 and over	18	15·5
	All Patients*	116	100·0

*Excludes eight patients who never went into coma

in hospital than lower class patients, and that they had more frequent but much shorter stays in hospital. The same investigators (1953, 1954a, b) found that the incidence of schizophrenia was higher in the lower social classes. Hollingshead, Ellis, and Kirby (1954) found that schizophrenics were socially more mobile than the average. All the above papers emanate from the U.S.A. where social conditions differ in important respects from those in Great Britain.

The psychiatric social worker (I. L.) tried to secure an interview, usually lasting from 1 to 2 hours, with the relatives, the patient, or both. The patients were often suspicious and the relatives anxious during the interview, so that repeated visits were undesirable, and in fact proved unnecessary. Spontaneous talk was encouraged and prompting avoided, although sometimes it was necessary to guide the conversation along subjects relevant to this inquiry. In particular, we were interested in the reasons for readmission to hospital, and for seeking or avoiding medical help. We wished to assess the part played by the relatives in the curtailment or extension of hospital care. We sought to find the effect on the relatives of dangerous, suicidal, or socially embarrassing behaviour, *e.g.* audible conversations with hallucinatory voices, which would be noticed by persons outside the family circle. The activities of the ex-patient were recorded with reference to his work, and social and leisure-time activities. As far as possible facts rather than opinions were recorded.

RESULTS

(1) *Relationship between Clinical and Social Assessment of Outcome.*—As will be seen from Table I, the clinical assessment of the patient corresponded in the majority of cases to his social assessment:

(*i*) earning his own living and independent,

(*ii*) dependent on his family, friends, or social agencies,

(*iii*) in hospital

The recovered patient still in hospital on the last day of the follow-up period was awaiting discharge. The differences between the social outcome groups in respect of clinical outcome are highly significant ($x^2 > 24$; $n = 4$; $P < 0{\cdot}0001$), and on the whole persons who were judged to be well by social standards were likewise assessed by clinical standards.

(2) *Effect of Dangerous or Socially Embarrassing Behaviour on Possibility of Discharge.*—It seemed likely to us that persons who had exhibited in the course of their illness suicidal or homicidal tendencies or features that made their presence an embarrassment to their families might be less readily accepted at home. Our results supported this view, but it was surprising, nevertheless, to find that relatives pressed for the discharge of a large proportion of the difficult patients.

Of 65 patients who stayed in hospital for less than one year during the follow-up period, 24 (37 per cent.) had displayed some definite kind of socially embarrassing behaviour and six of these had been dangerous to themselves or others.

In all, there were 41 patients who had been dangerous to themselves and/or to others (nineteen of whom also presented embarrassing symptoms), but the families of 22 (54 per cent.) of these themselves sought their discharge.

Of 36 persons who exhibited socially embarrassing features, the families of 23 (64 per cent.) wanted them home.

Of 46 patients who did not exhibit any of these symptoms, 39 (84 per cent.) had relatives who pressed for their discharge.

In the series as a whole, the relatives of 68 per cent. took active steps to secure discharge. The differences with respect to family pressure for discharge between patients who were dangerous or socially embarrassing and those who were not are highly significant ($\chi^2 = 10$; $n = 2$; $P < 0{\cdot}01$); the discharge of those patients who were dangerous either to themselves or others or who had socially embarrassing symptoms was not sought after to the same extent as that of those who did not exhibit such features.

It is not therefore surprising to find that, among 65 patients who either did not go into hospital during the follow-up period or who spent less than one year in hospital, a large proportion (83 per cent.) had relatives who had sought their discharge, and that among the long-stay group (2 years or more in hospital) of 37 patients, only 43·2 per cent. had relatives who were seeking their discharge. Among the intermediate group of 21 patients (between 1 and 2 yrs in hospital) two-thirds had relatives active in this respect.

These differences are highly significant ($P < 0{\cdot}001$). Associated with this finding is another highly significant result; among 41 persons dangerous to themselves or to others, 59 per cent. were found in the long-stay group, of the 36 with socially embarrassing symptoms, 31 per cent., and of the 46 with no such symptoms at all only 4 per cent. were found to have spent 2 or more years in hospital during the follow-up period ($P < 0{\cdot}001$).

(3) *Social Class**.—In our sample, the proportion of schizophrenic patients in Social Classes I and II is less than, and the proportion in Social Class V is the same as, the corresponding proportions in the general population of the County of London. The social class distribution of the schizophrenic patients is not significantly different from that of the population of the County of London ($P > 0{\cdot}05$). However, Blacker and Gore (1955) have shown that, for all types of patients admitted to the Bethlem Royal Hospital and the Maudsley Hospital, there is a much higher proportion of persons from Social Classes I and II than there is in the County of London as a whole. The social class distribution of our group of 126 schizophrenic patients is significantly different from that for all patients admitted to the Joint Hospital, in that the proportion of persons in Social Classes I and II is less and that in Social Classes IV and V is greater in the former than in the latter.

Studies of mental hospital admissions in England and Wales have been made by the Registrar-General (1955), and by Carstairs, Tonge, O'Connor, and Barber (1955), each of whom found the proportion of schizophrenics in Social Class V to be considerably higher than that in the corresponding general population. The diverse results (shown in Table IV)

TABLE IV

SOCIAL CLASS DISTRIBUTION OF SCHIZOPHRENIC PATIENTS COMPARED WITH THAT IN THE COUNTY OF LONDON

Registrar-General's Social Class	Percentage of Persons in each Social Class				
	London Administrative County*	Schizophrenic Patients			All In-Patients Maudsley/Bethlem Hospitals‡
		Present Sample	Mental Hospital Patients		
			Short-Stay†	Long-Stay†	
I	4·0	0·9	1·0	0·9	7·6
II	13·0	7·3	2·7	3·7	17·5
III	54·2	57·0	44·5	50·9	56·9
IV	11·9	18·3	16·6	12·8	11·1
V	16·9	16·5	35·2	31·6	7·0

* Males over 15 years of age in the County of London (1951 Census. County of London volume)

† Samples of patients resident in four mental hospitals serving the London area (Carstairs and others, 1955).

‡ All in-patients treated in the Bethlem Royal Hospital and the Maudsley Hospital during the period 1949–51 for whom an occupation was recorded.

* Occupations classified approximately to the classification of the Registrar-General (1951):

I Higher Professions, Company Directors, High Civil Service Administrators, Officers in the Regular Services.
II Artists, Teachers, Librarians, Pharmacists, Social Workers, Ward Sisters, Owners (business firms).
III Skilled trades and Clerks.
IV Semi-skilled Workers.
V Unskilled Workers.

underline the necessity for interpreting hospital statistics with great care unless one can be sure that the hospital sample studied is representative of all hospital in-patients in the corresponding area. In London, where there are relatively good facilities for in-patient psychiatric care outside the mental hospital service itself, even more caution than usual is required in the interpretation of results obtained from any single hospital or small group of hospitals.

The movement of schizophrenics up and down the social hierarchy (called "social mobility" by Glass, 1954) is of interest because it can be postulated that a schizophrenic illness might result in a deterioration of the patient's ability to maintain himself either in the social class of his parents or in that to which he has himself attained. Glass and Hall (1954) in a study of "Inter-Generation Changes in Status" have used a seven-point classification of social status. Our numbers are so small that it has been necessary to condense this to five groups roughly comparable to the social class groups of the Registrar-General. The status categories, 1; 2 + 3; 4 + 5; 6; 7, of Glass and Hall (pp. 31 and 182) appear to be approximately equivalent to the Registrar-General's Social Classes I, II, III, IV, and V respectively. A sample of just under 3,500 men drawn from the population of England and Wales was used by Glass and Hall who classified the subjects according to (*a*) their own social status, and (*b*) that of their parents.

TABLE V*

PERCENTAGE DISTRIBUTION OF MALE SAMPLE ACCORDING TO SUBJECTS' AND SUBJECTS' FATHERS' STATUS CATEGORY

Social Class of Subjects' Fathers	Social Class of Subjects				
	I	II	III	IV	V
I	**38·8**	34·8	20·2	4·7	1·5
II	5·7	35·1	48·1	6·3	4·8
III	1·2	11·2	**60·8**	15·9	10·9
IV	0·0	5·4	47·9	31·2	15·5
V	0·0	4·4	44·7	23·5	27·4

Figures derived from a two-stage, stratified, random sample of 9296 persons aged 18 years and over, drawn in June and August 1949 from the 'live' cards maintained in the various local offices of the National Registration System made by the Social Survey.
* Adapted from Glass and Hall (1954) p. 183.

Table V has been adapted from Glass, (1954, p. 183). The entries in the diagonal show the percentage of men who remained in the same social class group as their fathers, and the entries to the right of the diagonal show the percentage whose social class is lower in the scale than that of their fathers, while those to left show the percentage who have improved their social status.

A similar table, Table VI, has been drawn up for our sample, but because of the small size of the sample the entries show the actual number of patients in each cell instead of the percentages. In addition, the expected numbers, calculated on the basis of the data given by Glass and Hall, are shown. It has been necessary to combine Social Classes I and II and Social Classes IV and V because the numbers are too small to treat each of the five classes separately. Patients whose fathers were in Social Classes I and II show a significant deterioration ($P < 0{\cdot}01$) in social status, only 21 per cent. remaining the same, whereas 48 per cent. of Glass and Hall's subjects remained in the same status group as their fathers. In Social Class III, 63 per cent. of the patients and 73 per cent. of the general population sample either remained in the same category or moved to a better status than their fathers; the corresponding figures for Social Classes IV and V were 62 per cent. of the patients and 51 per cent. of the general population. These differences are not significant. ($P > 0{\cdot}05$).

Thus the patients for whom a schizophrenic illness is related to deterioration in social status are those whose parents were in Social Classes I and II. In Social Classes IV and V, the schizophrenics have in fact improved their social status over that of their fathers to a greater, but not significant, extent than corresponding members in the general population. Hollingshead, Ellis, and Kirby (1954) compared 25 schizophrenic patients, 25 psychoneurotic patients,

TABLE VI

RELATIONSHIP OF PATIENTS' SOCIAL STATUS WITH THAT OF THEIR FATHERS (COMPARISON OF OBSERVED WITH EXPECTED NUMBERS OF PATIENTS)

Social Class of Patients' Fathers	Social Class of Patients						Total
	I and II		III		IV and V		
	Observed	Expected	Observed	Expected	Observed	Expected	
I and II	6	13·8	15	12·3	8	2·9	29
	$\chi^2 = 11{\cdot}6$; $n = 2$; $P < 0{\cdot}01$ (using Yates correction)						
III	2	6·3	30	31·0	19	13·7	51
	$\chi^2 = 5$; $n = 2$; $P > 0{\cdot}05$						
IV and V	1	1·4	17	13·5	11	14·1	29
	$\chi^2 = 1{\cdot}6$; $n = 2$; $P > 0{\cdot}05$						

and sixty controls (not patients) with respect to social mobility measured by the social rating of the subject relative to that of his father. They found that the schizophrenic sample had moved upwards to a greater extent than either of the other two samples, but it is not possible to compare these results with our own as different criteria were used.

Table VII was compiled in order to determine whether the illness caused a deterioration in the type of work performed and whether the nature of the previous occupation played a part in the chance of resuming employment. In this connexion it is interesting to find that a comparison of the occupational status of patients before admission with that after discharge reveals little difference. It can be seen that on the whole patients remain in the same category after discharge as they had been in before admission; in all, excluding five unemployed before admission and still so after discharge, 93 (78 per cent.) persons remained in the same category or improved their status after discharge relative to pre-admission status (two students who moved up to Social Classes I and II were counted with three who remained as students, three who were students before admission and who were in Social Classes IV and V after discharge were regarded as having slid down the social scale).

TABLE VII

COMPARISON OF OCCUPATIONAL STATUS BEFORE ADMISSION AND AFTER DISCHARGE

Before Admission	After Discharge						
	I and II	III	IV and V	Housewives	Students	Unemployed	All
I and II	8 (89%)	–	–	–	–	1	9
III	–	45 (78%)	4	1	–	7	57
IV and V	1	7	20 (59%)	–	–	6	34
Housewives	–	–	–	7 (70%)	–	3	10
Students	2	–	3	–	3	1	9
Unemployed	–	–	–	–	–	5	5
All	11	52	27	8	3	23	124

(4) *Employability of Ex-patients.*—The length of time for which the patient was in employment during the 5-year follow-up period in relation to the total possible time was used as an index of employability. For example, if the patient were out of hospital for 4 years and if he worked during 3 of these years, his employability ratio (E.R.) was said to be 75 per cent. If he were out of hospital for only one year and during the whole of that time he was able to work, his E.R. was 100 per cent. There is a highly significant ($P < 0{\cdot}0001$) association between a good clinical outcome and a high employability ratio and the converse is also true (see Table VIII). Of those who had an E.R. of 0 per cent. (23 patients), 78 per cent. were assessed clinically as *unchanged or worse;* of those with an E.R. between 75 per cent. and 100 per cent. (78 patients), the condition of 44 per cent. was assessed as *recovered*, 15 per cent. as having a *residual defect*, 18 per cent. as presenting mild psychotic symptoms, and 23 per cent. as *unchanged or worse*. Thus, of 56 patients either *recovered* or with a *residual defect*, 82 per cent.

TABLE VIII

EMPLOYABILITY IN RELATION TO CLINICAL ASSESSMENT AT END OF A 5-YEAR FOLLOW-UP PERIOD

Clinical Assessment at end of 5-year Follow-up		Employability Ratio					Irregular Employment	Total
		0	1–24	25–49	50–74	75–100		
Recovered	Number	1	–	–	–	34	2	37
	Per Cent.	2·7				91·9	5·4	100·0
Residual Defect	Number	1	1	–	1	12	4	19
	Per Cent.	5·3	5·3		5·3	63·2	21·1	100·0
Mild Psychotic Symptoms ..	Number	3	–	–	2	14	–	19
	Per Cent.	15·8			10·5	73·7	–	100·0
Same as at Discharge	Number	10	–	–	2	11	1	24
	Per Cent.	41·7			8·3	45·8	4·2	100·0
Worse than at .. Discharge ..	Number	8	2	1	6	7	–	24
	Per Cent.	33·3	8·3	4·2	25·0	29·2		100·0
Total	Number	22	3	1	11	78*	7	123
	Per Cent.	18·7	2·4	0·8	8·9	63·4	5·7	100·0

χ^2 Test. E. R. Groups as indicated by brackets at margins
Degrees of Freedom = 4; $\chi^2 > 23{\cdot}5$; $P < 0{\cdot}0001$

* Excludes one patient for whom clinical assessment was not available

had an E.R. of 75 to 100 per cent. Of those who were said to be *unchanged or worse* (48), 37·5 per cent. also had an E.R. of 75 to 100 per cent. and, indeed, 54 per cent. were employed for at least half of the time they were out of hospital. In short, then, a substantial proportion of those whose clinical rating was poor were apparently able to work satisfactorily. This finding is of importance nowadays when there is a move to treat chronic mental patients out of hospital, but it depends to a considerable extent on the present conditions of full employment. Undoubtedly, the situation would not be so satisfactory if the level of employment in the country fell markedly. When the employability is compared with the length of hospitalization, it is found that all of the 23 patients with an E.R. of 0 per cent. stayed in hospital at least one year and 87 per cent. of them for at least 2 years, whereas 40 per cent. of those (79) who had an E.R. of 75 to 100 per cent. were never admitted during the follow-up period, 32 per cent. were in hospital for less than 1 year, 18 per cent. for at least 1 year but not as long as 2 years, and only 10 per cent. for 2 years or more. Of the fifteen persons whose E.R. fell between these extremes, 40 per cent. spent less than 2 years in hospital. These differences between the groups are highly significant ($P < 0{\cdot}0001$).

We have already seen that clinical outcome is highly correlated with length of stay in hospital. Nearly all the patients clinically assessed as recovered or improved were employed for a large part of the time available to them, and it is likely that their employability was used implicitly in making the clinical assessment. In the group whose condition was assessed clinically as unchanged or worse (48 patients), seventeen were in hospital for less than 2 years; of these, twelve (71 per cent.) had an employability ratio of 75 per cent. or more and only one (6 per cent.) was not employed at all during the period available to him. On the other hand, of the remaining 31 patients who were in hospital for at least 2 years or more, only six (19 per cent.) had an employability ratio of 75 per cent. or more, and seventeen (55 per cent.) were not employed at all during the period available to them. The differences between the short- and long-stay patients, who were assessed clinically as unrecovered, in respect of employability are highly significant ($P < 0{\cdot}001$). It seems likely therefore that the period of time spent in hospital is of importance with regard to employment after discharge, independently of its associations with the clinical condition.

(5) *Certification and Length of Stay in Hospital.*—It is sometimes thought that a certified person may have to stay in hospital longer than a voluntary patient, and indeed our figures bear out this supposition, for the differences between certified and voluntary patients with respect to duration of stay are highly significant ($P < 0{\cdot}001$). Out of a total of 31 voluntary patients, 61 per cent. stayed for less than one year and only 10 per cent. for at least 3 years, whereas the corresponding figures for certified patients were 20 and 42 per cent. Nevertheless, of patients who spent only a short time in hospital (less than one year), one-third were certified, so that certification *per se* does not preclude a speedy recovery. Just under half of the certified, two-thirds of the voluntary patients, and nine-tenths of those who did not go into hospital during the follow-up period were employed for at least three-quarters of the time during which they were out of hospital. These figures all refer to mental hospital admissions during the follow-up period (Table IX).

Discussion

In this series, duration of total stay in hospital during a follow-up period of 5 years is closely linked with the patient's clinical condition at the end of the period. This finding suggests that statistical studies measuring course and outcome in terms of hospital stay can, in fact, serve a useful purpose. The most interesting results are those relating social factors to outcome. An encouragingly high proportion of relatives were willing to have the patients home, even

TABLE IX
EMPLOYABILITY IN RELATION TO LEGAL STATUS DURING FOLLOW-UP PERIOD

Legal Status during Hospitalization		Employability Ratio					Irregular Employment	Total
		0	1–24	25–49	50–74	75–100		
Certified Patients ..	Number	18	2	1	8	26	1	56
	Per Cent.	32	3·6	1·8	14·3	46·4	1·8	99·9
Voluntary Patients ..	Number	5	1	–	2	22	4	34
	Per Cent.	14·7	2·9	–	5·9	64·7	11·8	100·0
Not Hospitalized ..	Number	–	–	–	1	31	2	34
	Per Cent.	–	–	–	2·9	91·2	5·9	100·0

When employability ratio is grouped as marked: Degrees of Freedom = 4; $\chi^2 = 23{\cdot}0$; $P = 0{\cdot}0001$

though they were or had been dangerous either to themselves or to others or were exhibiting socially embarrassing symptoms. On the whole, however, such patients tend to remain in hospital longer than others.

When the social status of the patients was compared with that of their parents, 59 per cent. either kept within the same social class status or improved upon their parents in this respect. Glass and Hall (1954) estimated that the corresponding figure in the general population was 71·8 per cent. But it is only among patients whose parents were in Social Classes I and II that this downward trend is marked. Indeed, among patients whose parents were in Social Classes IV and V, there was a higher percentage of persons with an upward trend (62 per cent.) than in a corresponding section of the general population (51 per cent.), but this difference is not statistically significant. In view of the established genetical basis of schizophrenia (Mayer-Gross, Slater and Roth, 1954), it may be that a familial tendency to this disease might account to some extent for the unduly high representation of the lower social classes among schizophrenic patients. The family "prestige" may degenerate with each successive schizophrenic generation until it reaches the bottom, when, of course, further deterioration is impossible and any change in status can only be an improvement.

The extent to which a patient was able to take up employment was related to his clinical condition and the length of time he had spent in hospital during the 5-year follow-up period, though rather more closely to the latter than the former; persons with a good clinical rating who were not in hospital for longer than one year apparently found little difficulty in maintaining themselves in employment while they were out of hospital. Conversely, the employment record of the patients who showed clear evidence of psychosis at the end of the follow-up period and who had spent a long period in hospital was not good. Nevertheless, over one-third of the patients who presented clear evidence of psychiatric abnormality were able to stay in employment for over three-quarters of the time available to them in the follow-up period. Although certified patients stayed in hospital longer than voluntary patients, as many as one-third of the patients remaining in hospital for less than one year were certified.

Summary

A total of 126 patients who had had schizophrenic illnesses treated with insulin coma were followed up as completely as possible for a period of 5 years after their discharge from the Maudsley Hospital. There was a high correlation between length of hospital stay during the 5-year period and clinical and social outcome. Previous findings based on records of in-patient treatment alone were largely confirmed. At the end of the follow-up period nearly a quarter of the patients were earning their living and socially independent, in spite of giving persistent evidence of psychosis.

We are indebted to the Medical Superintendents of mental hospitals and other doctors who have supplied us with information, and to the Board of Governors of the Bethlem Royal Hospital and the Maudsley Hospital, whose enlightened policy in establishing a special follow-up office has provided us with the facilities for this work.

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PULMONARY TUBERCULOSIS IN NORTHERN IRELAND

AN EXAMINATION OF THE STATISTICAL DATA FOR 1948–54

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Introduction

In countries where mortality statistics are reasonably complete but where morbidity statistics are not, there is a danger that variations in death rates will be accepted too readily as indicative of similar variations in sickness rates. The errors of such acceptance are obviously small for diseases which are usually fatal, and the greatest difficulties arise in deducing secular trends of morbidity from mortality data of diseases with decreasing fatality rates. Northern Ireland is such a country and respiratory tuberculosis is such a disease. This particular combination of disease and country is probably studied more easily than others because in Northern Ireland all the tuberculosis services, for the whole population of about 1·4 million, are controlled by a single authority, the Northern Ireland Tuberculosis Authority. The purpose of this paper is to examine the existing morbidity and mortality data in an attempt to assess their value as measures of the success of the fight against respiratory tuberculosis.

The crude death rate attributed to respiratory tuberculosis in Northern Ireland fell from 128 to 14 deaths per 100,000 of the population between 1922 and 1954. During the first 24 years the rate was reduced by 50 per cent., and during the last 8 by more than 75 per cent. A full appreciation of this trend cannot be made without reference to the age and sex distribution of the mortality, because the changes have not been uniform in every age and sex group; indeed in some, notably men aged 55 years and over, the rates have increased (Cheeseman, 1952).

It is more difficult to obtain comparable morbidity rates. Mortality rates are of little value as an indirect measure of the trend of morbidity because they are influenced not only by the volume of disease but also by increasing success in the treatment of infected persons. For the community as a whole, few morbidity data are available prior to the establishment of the Northern Ireland Tuberculosis Authority in 1946. To put their notification records into proper perspective, the impact of the Authority's work on the tuberculosis problem must be appreciated. The Authority was instituted with a unique responsibility, for the whole country, "of securing, in co-operation with sanitary and other local authorities, the prevention and more effective treatment of tuberculosis and kindred diseases" (Northern Ireland Tuberculosis Authority, 1948).

The resources inherited in 1946 were meagre; they consisted of some 500 beds in five hospitals, three chest clinics with *x*-ray facilities, a static mass miniature radiography unit, and some forty poorly equipped dispensary premises. The development of these resources and the new facilities provided since 1947 have been described elsewhere (*Brit. med. J.*, 1954; Elder, 1953), and the present situation may here be summarized briefly. About 970 beds are now available in the Authority's hospitals and 700 in other hospitals. There are 28 chest clinics, all but six being attached to hospitals with full diagnostic facilities. Two mobile mass radiography units have supplemented the existing static unit and a B.C.G. vaccination programme is in operation. The service is medically staffed on an area basis with a consultant and two or more chest physicians, or assistant chest physicians, in each area.

Notifications of respiratory tuberculosis under the Authority's scheme are available by age, sex, and "state of disease" classification for each year since 1948. In 1952, it was decided to exclude patients with active primary tuberculosis from the published notifications (Kelly, 1955), but the relevant details of such patients from 1952 onwards have been made available to me (Harvey, 1955), and in this report such patients are included in all references to notifications. The Authority uses the classification

suggested for England and Wales by the Ministry of Health (1947):

Group 1. Cases with slight constitutional disturbances.
Group 2. All cases which cannot be placed in Groups 1 and 3.
Group 3. Cases with profound systematic disturbance or constitutional deterioration, and with marked impairment of function, either local or general.

In addition all notifications are further subdivided as follows:

Class A. Cases in which tubercle bacilli have never been discovered in any exudate, excrement, discharge, or tissue.
Class B. Cases in which tubercle bacilli have been found at any time in any exudate, excrement, discharge, or tissue.

The annual notifications and their distribution by age and sex from 1948 to 1954 are shown in Table I. The downward trend for the five consecutive years in the absolute numbers from 2,499 to 1,614 occurred in spite of the increasing intensity of the ascertainment procedures. Relatively, the largest decrease occurred in the period 1948–50, and since then the decrease has been relatively small.

Although a population census was held in 1951, sufficiently accurate estimates are not available for non-census years to permit a critical examination, by age and sex groups, of the 7-year trend. If it is assumed that, over this short period, the age and sex distribution of the population did not materially change, then there is some evidence for males, but not for females, of a change in the age distribution of notified disease. Even over this short period, the proportion of male cases notified in the age group 20–29 years has fallen, while that in the age group 50 and over has increased. Moreover, even these crude figures show that male and female notifications had very different age distributions, to which later reference is made, throughout the whole period.

Present Age and Sex Distribution

Age and sex specific mortality and morbidity curves for respiratory tuberculosis have been prepared by using data for the 1951 population and the deaths and notifications in the three years 1950–52.

The first part of Table II (opposite) shows the mortality rates; these are plotted in Fig. 1 (opposite) with the corresponding rates for England and Wales. For convenience, the rates for the oldest age group, 75 years and over, are plotted at 75 years. In considering the curves for Northern Ireland, too much attention should not be paid to small irregularities for two reasons:

(*i*) in some age groups the numbers of deaths were small;

(*ii*) there is evidence that the ages given at death registration, particularly in 1950 and 1951, were frequently only approximate.

TABLE I

PERCENTAGE AGE DISTRIBUTION OF NOTIFICATIONS OF RESPIRATORY TUBERCULOSIS FOR EACH SEX (NORTHERN IRELAND, 1948–54)

Sex	Age Group (yrs)	Year						
		1948	1949	1950	1951	1952	1953	1954
Male	0– 9	6·8	12·1	12·2	11·1	12·9	12·1	11·0
	10–19	15·1	14·9	15·2	16·5	17·8	18·8	17·0
	20–29	29·5	25·0	23·0	22·9	20·7	21·4	19·0
	30–39	14·7	14·2	14·9	13·1	14·0	13·3	13·3
	40–49	17·1	14·6	13·5	14·0	11·8	11·4	15·7
	50–59	9·8	10·4	12·2	12·4	12·9	11·7	11·2
	60 and over	7·1	8·7	8·9	9·9	9·8	10·6	12·8
	Not known	—	—	—	0·1	—	0·7	0·1
	Total	100 (1,259)	100 (1,103)	100 (908)	100 (909)	100 (898)	100 (884)	100 (860)
Female	0– 9	4·8	11·4	11·5	10·2	11·9	12·7	11·0
	10–19	24·9	24·3	23·1	23·5	25·7	27·0	24·5
	20–29	36·0	32·0	31·5	35·3	31·3	31·5	31·3
	30–39	16·6	14·2	15·5	15·2	13·1	14·6	16·0
	40–49	9·7	8·8	8·6	7·5	7·8	5·5	7·8
	50–59	4·8	5·3	4·9	4·3	5·2	3·7	3·6
	60 and over	3·3	4·0	4·9	3·9	4·8	4·7	5·4
	Not known	—	0·1	0·1	0·1	0·2	0·4	0·3
	Total	100 (1,240)	100 (1,074)	100 (922)	100 (864)	100 (872)	100 (788)	100 (754)
	Total	(2,499)	(2,177)	(1,830)	(1,773)	(1,770)	(1,672)	(1,614)

Figures in brackets show numbers of notifications.

TABLE II
AVERAGE ANNUAL DEATH AND NOTIFICATION RATES PER 100,000 OF POPULATION FROM RESPIRATORY TUBERCULOSIS BY AGE AND SEX (NORTHERN IRELAND, 1950–52)

Age Group (yrs)	Death Rates		Notification Rates	
	Male	Female	Male	Female
0– 4	2	2	78	77
5– 9	—	1	82	75
10–14	1	2	82	98
15–19	7	18	185	301
20–24	29	45	233	321
25–29	44	61	182	236
30–34	54	48	149	168
35–39	52	32	132	105
40–44	53	37	142	88
45–49	72	18	148	72
50–54	100	34	180	67
55–59	80	30	167	46
60–64	109	34	158	58
65–69	74	41	} 78	} 31
70–74	69	35		
75 and over	30	20		
Total	39	27	136	126

Maximum male mortality in Northern Ireland occurred at about the age of 60 years, some 5 years younger than the peak rate in England and Wales. In sharp contrast, the female mortality was greatest at about age 30, as in England and Wales. In passing, it should be noted that, except among old men, the Northern Ireland rates consistently exceeded those of England and Wales. The secondary peak in the female mortality curve at about age 68 in Northern Ireland is of interest as it is not a feature of the curve for England and Wales.

Similar examination of the Northern Ireland notification rates (last part of Table II and Fig. 2, overleaf) reveals a bimodal male curve; the maximum rate occurred at about age 22 and another high rate (some 50 per 100,000 less than the maximum) at about age 53. The female notification rates however rose to the early maximum at the same age as the males, but thereafter fell continuously. The level of the early maximum rate was higher in females than in males, by some 80 per 100,000. (It should be noted that in Figs 2 and 3 the rates for age 65 and over have been plotted at age 72½).

Using the notifications in Birmingham for 1951, Lowe (1954) first drew attention to the bimodal character of the age distribution of respiratory tuberculosis notifications among males in England and Wales, although Stocks (1950), from the limited data then available, thought that some such sex difference was likely at later ages. Lowe was able to

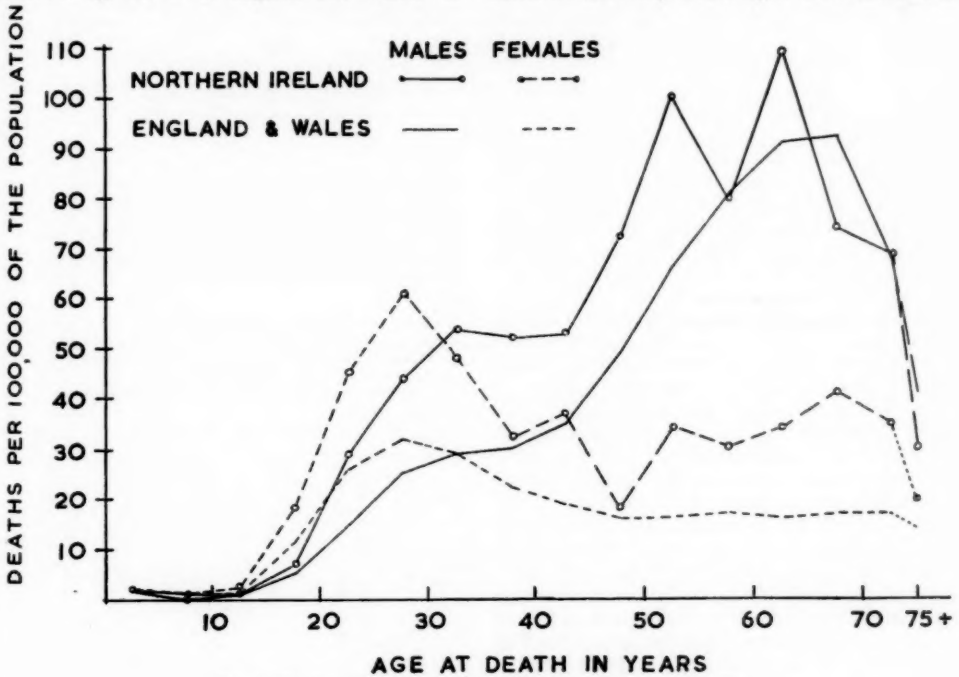

FIG. 1.—Respiratory tuberculosis mortality, average annual rates, 1950–52.

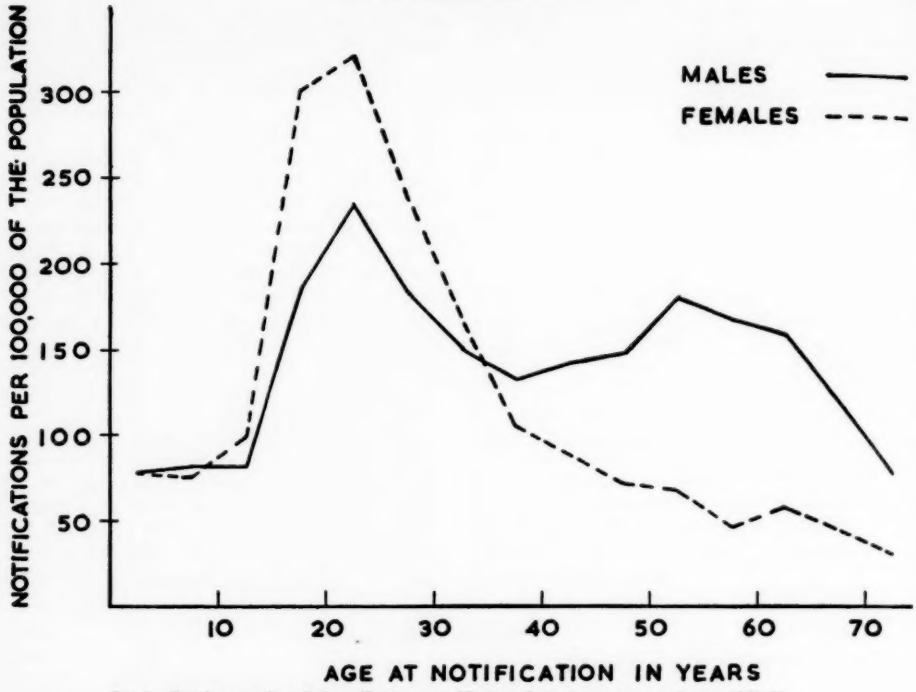

FIG. 2.—Respiratory tuberculosis notification rates, Northern Ireland, average annual rates, 1950–52.

demonstrate that, when notifications were classified by state of disease, female rates in each of the three groups reached a maximum at age 20–24. However, for males, the Group 1 rates had only one peak and this was at age 15–19; the Group 2 rates had two peaks at ages 20–24 and 45–49; and the Group 3 rates had only one peak at age 50–54. Although not commented upon (this aspect of the disease was not the main purpose of his work), his rates for females with Group 3 disease, and to a lesser extent with Group 2, increased slightly at the older ages.

The Northern Ireland notification rates, after similar classification, give curves with characteristics like those of Birmingham (Table III and Fig. 3, opposite). For females there is one well-defined peak for each group in the young adult ages, at 15–19 years for Group 1 and 20–24 for Groups 2 and 3. For males there is one peak for Group 1 at age 15–19, two for Group 2 at 20–24 and 50–54, and one for Group 3 at 60–64. In the Group 3 rates for males there was also a very slightly raised rate in the age group 20–24 compared with rates in adjacent age groups, but Fig. 3 shows that this results in only a slight disturbance to the upward trend in these young adult ages. As with the Birmingham data, there was a slight increase in the age specific rates for Group 3 disease among females after age 59 . It must be noted that of the 5,373 notifications on which these Tables are based, 65 were not classified by state of disease and have been excluded from Table III. Their inclusion

TABLE III

AVERAGE ANNUAL NOTIFICATION RATES PER 100,000 OF POPULATION BY AGE, SEX, AND SEVERITY CLASSIFICATION (NORTHERN IRELAND, 1950–52)

Sex		Male			Female		
Group		1	2	3	1	2	3
Age Group (yrs)	0– 4	66	2	10	62	3	11
	5– 9	72	5	6	67	5	4
	10–14	71	7	4	77	15	5
	15–19	110	51	24	161	103	36
	20–24	102	98	34	156	118	43
	25–29	69	93	21	92	111	32
	30–34	53	69	26	72	71	24
	35–39	40	67	26	36	47	21
	40–44	29	77	36	24	43	20
	45–49	30	81	34	19	36	15
	50–54	25	95	56	16	35	16
	55–59	15	95	53	9	27	9
	60–64	12	72	68	8	27	21
	65 and over	7	35	28	1	10	14
	Total	55	53	26	60	45	19

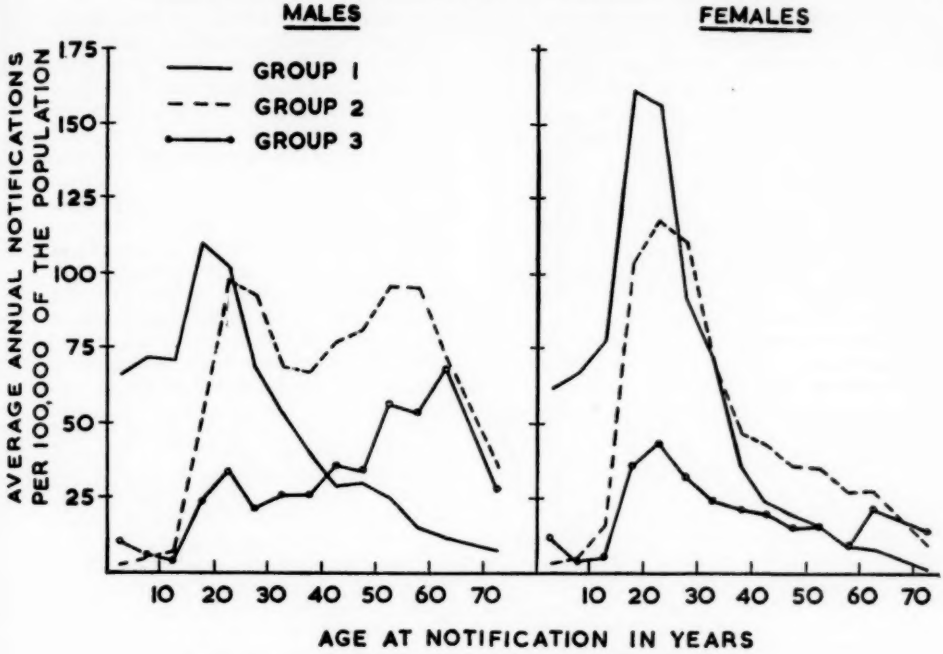

FIG. 3.—Classified respiratory tuberculosis notification rates, Northern Ireland, 1950–52.

in the appropriate age groups, even if they were all of the same classification, would make so little difference to the notification rates that none of the foregoing observations would be materially altered.

Table IV sets out the notification rates for the full classification. With so much subdivision, many of the resulting rates were small, but it would appear that the male differences and female similarities in the ages of peak rates between Groups 1, 2, and 3 were features of both Class A and Class B notifications. In view of the small numbers in Class B, and of the fact that Class A is, in effect, a residual group,

TABLE IV

AVERAGE ANNUAL NOTIFICATION RATES PER 100,000 OF POPULATION BY AGE, SEX, AND SEVERITY AND SPUTUM CLASSIFICATION (NORTHERN IRELAND, 1950–52)

Sex		Male						Female					
Class		A			B			A			B		
Group		1	2	3	1	2	3	1	2	3	1	2	3
Age Group (yrs)	0– 4	64	2	6	2	—	4	62	2	7	—	1	4
	5– 9	71	5	4	1	—	2	66	4	1	1	1	3
	10–14	69	5	2	2	2	2	72	11	3	5	4	2
	15–19	99	29	12	11	22	12	141	60	16	21	43	21
	20–24	84	47	10	18	51	23	130	68	17	27	50	26
	25–29	49	49	6	20	43	15	76	61	7	16	50	25
	30–34	45	34	7	8	35	19	58	35	8	14	36	16
	35–39	26	29	8	14	38	18	29	24	7	7	23	14
	40–44	21	31	9	9	46	26	20	17	4	4	26	17
	45–49	19	36	9	11	45	25	17	22	8	2	13	7
	50–54	18	53	14	7	43	43	12	14	5	4	21	11
	55–59	12	41	8	3	53	45	9	17	5	—	10	4
	60–64	8	40	20	4	33	48	7	14	11	1	12	10
	65 and over	6	16	9	1	19	19	—	5	6	1	4	8
	Total	47	26	8	8	27	18	53	25	7	8	20	12

the homogeneity of which is dependent upon the thoroughness of the search for the bacillus being uniform for all patients, no attempt has been made to pursue this aspect of the data.

In effect these results show that there is very little advanced (Group 3) disease in the notifications of young men and very little early disease (Group 1) in the notifications of the older men. In the young adult age groups, when each stage of disease is most notified among females, the latter consistently have a higher rate than males, but even so, relatively few of all female notifications at these ages refer to advanced disease.

Discussion

Crude mortality rates and crude notification rates, without, at least, subdivision by age and sex, are clearly unreliable indices on which to base the policy of a tuberculosis service, or to assess its efficiency. The increasing mortality among men aged 55 and over, and the preponderance of severe disease among them, are both hidden by the decreasing mortality rates and numbers of notifications at all ages combined. Even with age and sex specific rates available, their interpretation is not easy. The ultimate criterion of the success of a tuberculosis service is the reduction of the frequency of occurrence of the disease in the community to negligible proportions. It seems unlikely that much more will be learnt about this frequency from the study of death rates alone, since successful treatment of the disease is continually becoming more possible.

However, tuberculin surveys, mass *x*-ray surveys, and proper use of notification data can all contribute to measuring the volume of disease. So far, the use of tuberculin surveys in Northern Ireland has been restricted to a single sample survey of Belfast schoolchildren (Sherrard, 1952) but within the last year a scheme has been started for the testing of 5-year-olds in Belfast schools, whom it is hoped to retest in a longitudinal study for some years to come (Calwell, 1956). The activities of the mass radiography service are discussed later, but no surveys on a communal basis have yet been undertaken in which an exhaustive effort has been made to examine every member of a locality. Thus for the time being the notification rates must remain as the only available measure of the disease frequency in Northern Ireland.

The efficiency of the notification rates as a measure of the true frequency of the disease depends in turn on the efficiency of the diagnostic activity in the community. Theoretically, the latter can only be considered as wholly efficient if the diagnostic procedure invariably detects the disease in a person who has it and if all members of the community are examined. Thus, if mass radiography is accepted as an efficient diagnostic tool, then it must be applied to all members of the community to achieve this theoretical ideal. The importance of this complete "screening" has been stressed by many workers; for example, Bradbury (1948) reported the results of five mass *x*-ray surveys in Lancashire and concluded that the variation in the amount of tuberculosis detected was almost directly proportional to the proportion of the population in the surveyed areas agreeing to be *x*-rayed. He estimated that even with a 70 per cent. response only about 50 per cent. of the tuberculosis would be discovered.

In Northern Ireland diagnostic activity is essentially in the control of the chest clinics and the mass radiography units. In 1954, there were 67,962 attendances at the former, but only 16,089 of these were made by persons seen for the first time and of these about 40 per cent. were contacts of known tuberculosis patients. In the same year, 96,219 *x*-ray examinations were carried out by the mass *x*-ray units. So that in that year the proportion of the total population which had a chest *x*-ray was, even at a most generous estimate, very small and certainly less than 15 per cent. It might be argued that if a different 15 per cent. were *x*-rayed each year then complete coverage would be achieved relatively soon. From the above it is clear that such "rotation" could only be achieved by the mass *x*-ray units, but, in fact, the present policy is such that it is probable that a large proportion of the persons *x*-rayed in any one year are *x*-rayed annually.

Unfortunately data are not available about the numbers *x*-rayed for the first time. In 1954, apart from 9,266 persons referred by general practitioners of Belfast (Barr and Ritchie, 1955), and 3,544 persons *x*-rayed as part of an experiment in East Belfast (Ritchie, Calwell and Barr, 1955), the bulk of examinees were seen either as "individual volunteers" or as members of "organized groups". The former are persons attending open sessions held in various areas, and the latter attend under special arrangements made between the director of the service and employers or heads of institutions. The numbers in these groups are not available for 1954, but in the preceding year, of the total attending the static unit, 10 per cent. were individual volunteers and 90 per cent. were members of organized groups, while for the mobile unit the corresponding proportions were 30 per cent. and 70 per cent.

Clearly the mass radiography service is the most effective method in the search for new cases, but Table V shows that in 1954 only about 7 per cent. of the total population were examined. Moreover, because the larger part of the units' work, particularly in Belfast, is concentrated on organized groups, many of which are seen annually, in any one year only a very small proportion of the population, which must be less than 7 per cent. at present, are mass *x*-rayed for the first time. Thus, probably, the vast majority of the population have never attended a mass radiography unit. Table V shows that the mass *x*-ray activities have up to the present, been more intense in the young adult age groups than in others, so that such diagnostic activity in the older age groups must be negligible. These are the age groups in which, for men, there is a preponderance of advanced disease, a fact confirmed by the Rhondda Valley survey, of over 90 per cent. of the adult population, in which the maximum age and sex rate of infectious disease was found in males aged 50 and over (Cochrane, Cox, and Jarman, 1952).

TABLE V
MASS RADIOGRAPHY IN NORTHERN IRELAND IN 1950 AND 1954

Sex	Age Group (yrs)	Year			
		1950		1954	
		Number *x*-rayed	Percentage of Northern Ireland Population *x*-rayed	Number *x*-rayed	Percentage of Northern Ireland Population *x*-rayed
Male	Under 15	7,687	4·0	8,503	4·4
	15–24	9,584	9·2	14,651	14·1
	25–34	4,402	4·8	10,702	11·6
	35–44	3,903	4·4	7,850	8·9
	45–59	3,132	3·0	7,068	6·8
	60 and over	508	0·6	1,528	1·8
	Total	29,216	4·4	50,302	7·5
Female	Under 15	7,041	3·8	7,745	4·2
	15–24	10,313	9·8	18,502	17·6
	25–34	3,969	4·0	8,681	8·8
	35–44	2,201	2·3	5,363	5·7
	45–59	1,391	1·2	4,562	3·9
	60 and over	195	0·2	1,064	1·0
	Total	25,110	3·6	45,917	6·5

In the past it has been the policy to direct the mass *x*-ray service mainly at the young adolescent group, because this was the section of the community in which it was originally anticipated there would be most tuberculosis (Ritchie, 1952). To pursue this policy the net was cast to organized groups, largely arranged with industrial undertakings, to catch the annual recruitment of school leavers. Fig. 2, however, suggests that for males the frequency with which new cases are now found in the population is nearly as high in the old adults as it is in the young ones, and it would appear reasonable to think in terms of shifting the emphasis from the younger to the older age groups, particularly as in the older men the disease is likely to be more severe (Fig. 3).

It is unquestionably desirable, from the point of view of the individual young adult, that diagnostic procedures should be readily available to him, since if tuberculosis is discovered it will most probably be in its early stages and will be amenable to treatment. In turn, the community will also benefit in years to come in that the young tuberculosis patient discovered now and brought under observation should not become, some 30 years later, a source of infection to a future generation. At the same time, however, the present reservoir of infection in the older male age groups continues to spread the disease among young people. In this context the report on respiratory tuberculosis among old men by Wilkins (1956) is of some significance, in that of a small series of 35 men aged 65 and over who subsequently developed active diseases as many as sixteen showed no prominent chest symptoms.

Some authorities (*e.g.* Cox, Cochrane, and Crofton 1956), impressed by South Australian experience since 1951 (Woodruff, 1956), have suggested compulsory *x*-ray examination of people living in areas of high incidence and of persons whose work is such that one open case among them endangers others. Some (*Medical Officer*, 1956) feel that compulsion would not be generally acceptable, and have suggested that general practitioners might well be the best people to persuade their older patients to avail themselves of the facilities of the mass *x*-ray services and that health visitors and welfare workers whose activities bring them into the homes of the community could also be similarly persuasive.

Such arguments are based largely on the poor response rates to mass *x*-ray in England and Wales and apply equally in Northern Ireland. Of the suggested methods of increasing the diagnostic activity, compulsion is so far practised only in one instance, the annual *x*-ray of all undergraduate students at the Queen's University of Belfast (Johnston, 1956). Of the other methods, it should be noted that 90 per cent. of the school teachers in Northern Ireland have agreed to an annual *x*-ray examination and that all new entrants to the profession in grant-aided schools have their chests *x*-rayed at the initial medical examination. Finally in Belfast the scheme by which general practitioners can refer patients direct to the static *x*-ray unit already mentioned has been in force since 1952. All this goes only a small way towards the complete "screening" of the population necessary before the apparently favourable rates at

all ages combined can be regarded with complacency. Much more diagnostic activity is required, coupled with closer attention to the older men in the community.

Summary

The age of maximum mortality from respiratory tuberculosis in Northern Ireland in 1950–52 was approximately 60 years for men and 30 years for women. In this respect the mortality resembled that for England and Wales, although the level of the rates was generally higher in Northern Ireland.

The age distribution of the Northern Ireland notification rates in 1950–52 was bimodal for men and unimodal for women. The major peak in the male distribution occurred at about age 22 and the minor peak at age about 53. The maximum female rate occurred at about the same age as the major male peak.

Classification of the notification rates by stage of disease shows that the young adult male peak in the rates was largely due to the detection of early rather than advanced disease, while the peak at the older age was largely due to advanced disease. Although all stages of disease contributed to the young adult female maximum, early disease was preponderent; there was some evidence of a secondary peak in the age morbidity curve for advanced disease in the older age groups for females.

Although, while the tuberculosis services have been developing, the total number of notifications has decreased from year to year since 1948, the "age, sex, and stage of disease" interactions and possibly incomplete ascertainment make the interpretation of this trend impossible in terms of the true incidence of the disease.

Relatively fewer old than young adult people have been examined by routine mass radiography, and it is probable that relative to the true incidence less advanced disease than early disease is detected by this means. Although this is possibly balanced by more effective ascertainment of advanced disease by other methods, no evidence is available to assess such a balance. In a given year less than 10 per cent. of the population are examined by mass radiography policy.

In view of these conclusions, it is suggested that the time has come for a review of the mass radiography policy.

An appreciation of the present situation is required to see whether the technical resources available, in addition to the continued detection of early cases, can also help in the eradication of sources of infection by more active work amongst the older members of the community. In any case, the present poor response to mass x-ray, must be overcome and to this end many people, both in and out of the tuberculosis services, have a part to play.

I had discussions with Drs. H. G. Calwell and J. Ritchie while preparing this paper, and I am indebted to them for several useful suggestions. Mr. J. S. Crockett, Mr. J. D. Merrett, and Miss D. B. I. Wood helped in preparing the Tables and typescript. Mr. C. G. A. Bailie drew the diagrams. Further thanks are due to the secretary of the Northern Ireland Tuberculosis Authority and his staff for providing hitherto unpublished distributions of the notifications.

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PSYCHIATRIC ILLNESS IN THOSE ENGAGED TO BE MARRIED

BY

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Savage (1888) described a number of patients suffering from what he called "mental disorders associated with marriage engagements". In so doing he drew attention to the aetiological importance of sexual tension deriving from the engagement situation and hysterical personality traits in those affected. Janet (1903a), in referring to some dozen cases of this kind within his personal experience, agreed with Savage in the main, though attributing less significance to the sexual aspect and more to the personality of these patients, whom he regarded as psychasthenics.

It is proposed in this study to use data available from patients of this kind to try to throw more light on the origins, course, and outcome of this condition, which is characterized by anxiety, depression, and doubt about the engagement, beginning in those who are engaged to be married. In this connexion the term "engaged" is used to include "not only those formally engaged, but also those with an informal but definite understanding that they would be married at some future date" (Burgess and Wallin, 1953a). In order to avoid a cumbersome repetition of words it is proposed to employ the term "engyesis"* (from the Greek ἐγγυησής) to describe this clinical condition.

*I am indebted to Dr. C. P. Blacker for suggesting this term.

Material

In all, fifty cases were seen at the Maudsley Hospital, all but ten of which came under the care of the writer. Patients displaying engyesis when seen numbered 48, and two other patients admitted for some other condition gave clear histories of attacks of this kind earlier in life.

Of the 48 active cases, thirty men and one woman were in-patients, and nine men and eight women were out-patients. Some clinical details of the whole group are set out in Table I.

Results

The predominant symptoms in all cases were anxiety and depression. Insomnia, loss of appetite and weight, headaches, feelings of "tension", and lack of concentration were especially marked. Indecision about the marriage was very prominent in these patients. Other symptoms noted in certain cases were phobias (specially of travel or of going mad), unreality feelings, and asthma (two cases). In two patients, who showed also some ideas of reference and delusions of persecution, there was a history of previous illness in which these features had been manifest. The clinical picture was closely comparable to that described by Savage (1888) and Janet (1924).

TABLE I

CIVIL STATUS, FREQUENCY OF ATTACKS, AND AGE AT FIRST ATTACK, OF FIFTY ENGYETIC PATIENTS

Sex	Civil Status	Frequency of Attacks			Age at First Attack (yrs)									Total
		1	2	3+	Under 21	22–25	26–30	31–35	36–40	41–45	46–50	51–55	over 56	
Male	Bachelors	22	10	3	1	16	8	5	3	1	–	1	–	35
	Divorced Men	2	–	–	–	–	–	–	–	1	–	1	–	2
	Widowers	3	–	–	–	–	–	–	–	–	–	2	1	3
Female	Spinsters	7	3	–	1	6	1	1	1	–	–	–	–	10
	Divorced Women	–	–	–	–	–	–	–	–	–	–	–	–	–
	Widows	–	–	–	–	–	–	–	–	–	–	–	–	–
Total		34	13	3	2	22	9	6	4	2	–	4	1	50

The onset of symptoms in relation to the engagement was variable, as Janet (1903a) had noted. In some cases the symptoms began insidiously early in the engagement and built up steadily. It was noticed, however, that in other cases the illness suddenly began very soon (often a matter of days or hours) after the occurrence of some event on which the marriage date hinged. Booking a hall for the wedding reception, or finding a flat to live in, were examples of events of this kind. Freud (1918), dwelling on this phenomenon, attached special significance to the onset of the illness in relation to the removal of an external prohibition which had previously rendered any internal conflict needless. In other cases, where the marriage was to be linked to success in an examination or promotion at work, the symptoms began in relation to these events and the anxiety shown was often displaced thereon.

The symptoms were almost always displayed to the healthy partner, the patient's attitude being best summarized in the words, "You can see how ill I am. It would not be fair to you to go on with the marriage". The invariable response of the healthy partner could be summed up in the words "I love you, and will stand by you". At this point the patient's symptoms became worse, and this usually was the stage at which he (or she) was seen by the psychiatrist.

Attention is directed to some of the factors associated with this kind of illness, as evident from the clinical material which has been examined:

(*a*) *Sex.*—The preponderance of males (30 out of 31) in the in-patient group has no special significance, but arises from the fact that the writer's beds are all in the male wards. A fairer index of sex distribution is obtained from the out-patient group, where the bed factor does not operate. Of this group of seventeen patients, nine were men and eight women. Of male in-patients six had come through the writer's Out-patient Clinic, in respect of which therefore the figures become fifteen men and seven women.

(*b*) *Age.*—The youngest patient was a girl aged 18, the oldest a man aged 71. Of the fifty patients, 31 (62 per cent.) were 20–30 years of age at the time of the first attack, and 37 (72 per cent.) were aged between 20 and 35. As several patients were seen only at a subsequent attack the average age of patients when seen was rather higher than is shown. This point is made because Savage (1888) reported that the majority of his patients were over 30 years of age when seen.

The divorced men and widowers were all aged 44 or over, whilst the great majority of the bachelors and spinsters (43 out of 45) were aged 40 years or under.

(*c*) *Civil Status.*—No divorced women or widows appear in the group. Savage (1888) said he had never seen widows or widowers affected, but three widowers appear in the present series. It must be tentatively concluded that women who have been married are unlikely to become ill in this way.

(*d*) *Frequency of Attacks.*—Of the fifty patients, sixteen (32 per cent.) had more than one attack, and three (6 per cent.) had three or more. The frequency of broken engagements without engyesis was even higher. This tendency to repeated breakdown in subsequent engagements was noted by Savage (1888), and Janet (1924) recorded the case of a woman whom he saw in her sixth engagement-illness.

(*e*) *Stress.*—There was very little evidence of especial stress apart from the engagement situation. Three men were working for examinations, in three cases there were religious differences between the engaged pairs but little to suggest that these were of any great concern, one woman feared she might be pregnant, and the fiancee of another patient had been recommended for a breast operation. The nature of these stresses and the attitude towards them of the patients suggested that they played a relatively unimportant part in the aetiology of the illness.

The role played by sexual tension, to which Savage (1888) attached importance, is not easy to evaluate. In eleven of the fifty patients no information on this point was forthcoming. In the remaining 39 patients, however, it was found that two were cohabiting, sixteen were having frequent sexual intercourse, and 21 were chaste. It would seem that in nearly half of the cases where information was available, sexual tension could not be playing any large part.

There were only two cases where sexual activity was volunteered as a cause of anxiety. One of these was an effeminate man who knew himself to be impotent, the other a young woman who was very ignorant of sex and thought she might be pregnant though a virgin.

(*f*) *Previous Psychiatric Illness.*—Excluding previous attacks of engyesis, twenty out of the fifty patients (40 per cent.) gave a history of a clear-cut psychiatric illness for which they had sought medical advice. Depression, anxiety, hypochondriasis, and "black-outs" seemed to be the chief symptoms of which they had earlier made complaint. Two patients were liable to attacks of asthma. In one of these asthma was a presenting symptom followed later by anxiety; the other, a man who had three attacks of

engyesis, presented with asthma in one instance and anxiety symptoms in the other two.

(*g*) *Previous Personality.*—The frequency of recurrent attacks in certain individuals and the high rate of previous psychiatric illness point to the possible aetiological role of personality factors in these patients Savage (1888) thought hysterical traits were present. Raymond and Janet (1903) regarded these people as psychasthenics, with indecision as a prominent character trait.

An attempt was made to rate these patients with regard to certain personality traits on the basis of a full history. The trait looked for was scored as present only if it was a prominent feature of the previous personality. In this way the conclusion was reached that 21 out of 33 (63 per cent.) were especially obsessional, thirteen out of 29 (45 per cent.) were especially indecisive, and fifteen out of 25 (60 per cent.) were especially dependant upon their mothers. In the absence of any control group, no conclusions should be drawn from these figures, but they may act as pointers in further investigations.

(*h*) *Progress in Hospital.*—The thirty patients admitted to hospital comprised 29 men and one woman, and all but one of these have now been discharged. The reason for the preponderance of men has been given above. Presumably these patients were more severely ill, in the main, than those who remained out-patients. Reference to their case records shows that six patients (20 per cent.) were regarded as suicidal at some time during their stay.

In some cases patients were selected for in-patient treatment because there were few signs that the hesitation about the engagement situation would resolve while they remained out-patients. The mere act of admission seemed sometimes to clarify the situation, the healthy partner breaking off the engagement in the belief that the patient was now "mental". The engagements of eleven patients (38 per cent. of the discharged in-patients) were broken in hospital. An equal number of engagements was confirmed while the patient was in hospital. In every case but one, as shown in Table II, the engagement situation was clarified before discharge, and the resolution of doubt on this score was accompanied by marked improvement or recovery. Definitions of those terms as used here are given in Table II.

This removal of doubt regarding the engagement situation was not simply a manifestation of improvement, since there was clear evidence in nineteen cases that it antedated clinical improvement by a few days or weeks. Indeed, the impression was formed that discussions with the patient aimed at assisting him to clarify his mind regarding the engagement situation were therapeutically valuable. The fact that six patients, who later responded favourably, were admitted after breaking their engagements (Table II) shows that improvement may be delayed even after a firm decision about the engagement has been reached. It seemed, also, that admission to hospital justified the patient in his own mind when he subsequently broke the engagement, and some relief of persisting guilt feelings in this connexion was obtained where the admission to hospital occurred *after* the break, as in the group of six patients just mentioned.

TABLE II

CLINICAL STATE AT TIME OF DISCHARGE, WITH REFERENCE TO ENGAGEMENT SITUATION, OF 29 ENGYETIC IN-PATIENTS

Engagement	Clinical State			Total
	Unchanged	Improved*	Recovered	
Confirmed in Hospital ..	–	7	4	11
Broken in Hospital	–	7	4	11
Broken before Admission ..	–	3	3	6
Situation Unchanged	1	–	–	1
Total	1	17	11	29

* "Improved" means able to leave hospital, to work, and to live a normal life with only minor discomfort from occasional symptoms which were not present before illness.

"Recovered" means complete restoration to pre-morbid state.

Nine patients received electroplexy during their stay; the general impression was, however, that no more than temporary relief was afforded in this way, unless the engagement situation had also been clarified. The main treatment was directed to focusing the patient's thoughts on to his engagement so that he could arrive at a firm decision about it. It was important to avoid overt pressure in any direction. The partner was also interviewed as often as seemed desirable. Discussions of this kind usually resulted in a firm decision being made, in a way which left the couple satisfied that these had not been imposed by the therapist.

Not infrequently, the patient, having broken the engagement, would say that he was moving away from the district in which he had lived previously. This recalls the dictum of Savage (1888): "I know of no mental cases which benefit so much by sea voyages as these".

(*i*) *Follow-up.*—The difficulties of following the later progress of these patients are unusually great, because those whose engagements are broken often

move away, as mentioned, while those who marry tend to change their address. However, it was possible to follow up a total of 33 patients for periods of from 6 months to 5 years. It may be of interest to divide these into two groups: those whose engagements were broken and those who married.

Those whose engagements were broken comprised seventeen men and one woman. Seven men were completely recovered. One of these died from natural causes during a subsequent engagement not marked by engyesis and another from this group met his ex-fiancee by accident in the street and became re-engaged to her. Five men were improved and were troubled but slightly by residual symptoms (*e.g.* dryness of the mouth, feelings of loneliness). Two others, one man and one woman, were comparatively unchanged when they became engaged to other partners. Three men had relapses in which they committed suicide. It would seem that the results were generally favourable in twelve out of eighteen (66 per cent).

Those who married comprised twelve men and six women. Included here are the three subjects mentioned in the preceding section who became re-engaged (one man) or engaged to a different partner (one man; one woman). Of these twelve men, ten (83 per cent.) were found to be completely well at follow-up; one of these was the man who had become engaged again while still ill. Apart from one man who had slowly recovered in the course of a year or more, all reported that their improvement had begun immediately after marriage. It must be emphasized that the follow-up in some of these cases was less than one year, and only five years at most. What happened later in the marriage is not known, but two patients (a man who came under notice for depression at the age of 53, and a woman who suffered a phobic illness at 40) gave histories of recurrent engyesis 23 and 21 years earlier. The man had been impotent throughout his married life. Of the two remaining men, one continued to be ill after he married, while the other became well on marriage but has frequently relapsed since.

Three of the women (50 per cent.) are quite well. The other three have shown a fluctuating illness requiring out-patient treatment after initial improvement on marriage. One of these is the asthmatic referred to earlier, who presents herself with this symptom or with headaches and anxiety. It would seem that the results were generally favourable in thirteen out of eighteen (72 per cent).

In view of the possibilities of later illness, it is of interest that those who marry (about half the group followed up) do as well as those who do not.

Discussion

"Love notwithstanding, most couples must anticipate a measure of stress as part of their courtship experience", wrote Burgess and Wallin (1953b). It is possible that psychiatrists have insufficiently appreciated the truth of this statement, whilst recognizing that other epochs of life, as for example the puerperium, may be especially stressful.

Social factors relating to engagement and marriage have changed considerably from Savage's day to our own. The sexes now mingle more freely, sexual topics are discussed more openly, marriage is no longer the career for which the well-bred girl is prepared to the exclusion of all others, and divorce is much more frequent. Yet the engagement period is still stressful and apt to be marred by psychiatric ill-health. As the incidence of engyesis has not been assessed, it is not possible to evaluate the role of changing social customs in the aetiology of this condition. One is therefore thrown back to a closer examination of the people who are involved, in the light of what is known from the studies of normal engaged couples.

Unfortunately, no such studies seem to have been carried out in this country. Burgess and Wallin (1953) have collected much valuable sociological and psychological information on engaged couples, mainly undergraduates and their friends in metropolitan Chicago. Though only the crudest comparisons may be made with this group, it would seem that engyetics might have contributed disproportionately to the 3·1 per cent of men and 4·4 per cent. of women whose health became impaired during engagement (Burgess and Wallin, 1953c), to those with low engagement success (Burgess and Wallin, 1953d), and especially to the group of broken engagements amounting to 50 per cent. in our patients as against 15 per cent. in the Chicago normals (Burgess and Wallin, 1953e). It would be interesting to see how far engyetics show the personality traits which Winch (1941) found to be important in the Burgess and Wallin study, as making for poor adjustment in engagement as well as in marriage. Questions of this kind must await fuller study, perhaps by questionnaire techniques, of a much bigger group than has been described here.

The early recognition of the condition here described may well fall to Marriage Guidance Clinics. Mudd and Preston (1950) report that, of clients consulting Marriage Counsellors at six selected clinics in the United States, the majority were aged 20 to 35, about one-half to two-thirds were women, up to 66 per cent. were single, and one of the problems about which advice was sought was postponing the marriage or breaking the engagement. Some

illustrative case histories of clients seen at their clinics closely reproduce the early attitude of most engyetics. There are reasons, it would seem, for believing that in the United States engyesis might occur in some proportion of the clients of Marriage Counsellors, and that follow-up studies carried out in such clinics might contribute to our knowledge of morbidity from this cause.

The acute illness subsided more or less completely with broken engagement or marriage in most of the cases described here, but the persistence or recurrence of symptoms after marriage in 28 per cent. of our cases is bound to enjoin caution on those who might be tempted to recommend that step. Janet (1903b) expressed his firm view that the marriage should always be proscribed. It appears, however, that 72 per cent of these marriages in our series have turned out well so far. One should not be too pessimistic where the marriage goes through even against proffered advice, though the longest follow-up period in this series is only 5 years, and many cases were followed for a much shorter period.

SUMMARY

(1) A study has been made of fifty patients manifesting psychiatric illness characterized by anxiety, depression, and doubt about the engagement, beginning in those who are engaged to be married. The term "engyesis" is used to designate this clinical picture.

(2) The condition occurs in both sexes, and is most common between the ages of 20 and 35 years. Bachelors and spinsters predominate. No case was encountered in women who had been divorced or widowed.

(3) The tendency to recurrent attacks in certain individuals, and the incidence of earlier neurosis in twenty (40 per cent.) of the fifty subjects, suggest that predisposing personality factors are important. Sexual frustration is unlikely to have much bearing on the origin of this condition.

(4) About half of the cases followed up for 6 months to 5 years married. About one-quarter of these subjects showed fluctuating ill-health afterwards, roughly the same proportion as in those who broke off their engagements.

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GROWTH FROM THREE TO FIVE YEARS

BY

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Current British literature contains few studies of the growth of pre-school children. The recent publication of half-yearly weights and heights by Acheson, Kemp, Parfit, Jefferson, Mynors, and Hewitt (1955) and the more detailed investigation of Hammond (1955) are the main features of current literature. The tables of Low (1952), though of recent publication, are derived from a longitudinal study of children born between the years 1923 and 1927. Before the first-mentioned publication we were dependent upon the work of Gore and Palmer (1949) in Britain and of various American investigators, notably Simmonds (1944), for our standards of weights and heights of pre-school children.

The present paper gives the results of an investigation into growth of children aged from 3 to 5 years.

Material and Methods

The observations were recorded on 947 male and 971 female children born in the Simpson Memorial Maternity Pavilion of the Royal Infirmary, Edinburgh. Multiple births were excluded, as were also children with a congenital malformation, or whose growth had been retarded by serious illness. Premature or post-mature children were excluded, no child being included who weighed less than 5½ lb. or more than 9 lb. at birth.

Children were weighed in vest, pants, and socks, on a beam balance to the last complete quarter-pound and 4 oz. were deducted for clothing. The supine crown-heel and crown-rump lengths were ascertained to the last complete millimetre on a measuring board of the type previously used (Thomson, 1956a). While the child was on the measuring board the intercristal pelvic width was measured to the last complete millimetre by using obstetrical callipers in conjunction with the steel millimetre scale incorporated in the board. The head circumference was measured over the most prominent portions of the occipital and frontal bones on a millimetre linen tape. The tape was checked frequently against the steel millimetre scale and replaced when a discrepancy was found.

The investigation was mainly cross-sectional, and children were examined within 7 days of the third, fourth, and fifth birthday, and at intervening quarters.

Results

Means and standard deviations for the five measurements are given in the Appendix. The only recent British work with which comparison can be made is that of Acheson and others (1955), which gives mean weights and mean heights for Oxford children at 6-month intervals. The mean weights of the Oxford children were greater than those reported here (Table I). They included underclothing, but, even with this advantage, the Oxford means of weight are significantly greater only in the case of males at 4 and 4½ years. Thus one may conclude that, in general, the differences between the mean weights of these two groups of children are not significant.

The mean heights given for the Oxford children are erect heights. After conversion to supine lengths, using Palmer's formula (Palmer, 1932), the differences from the present data are of little importance (Table I, opposite).

Of the American data, those of Simmonds are probably the best for comparison. They appear to represent an optimum standard of growth since, they were:

> "derived from measurements of a selected sample of 999 white children the majority of whose parents are above average both in educational and economic level and who are of North European ancestry."

The mean weights given by Simmonds were approximately 2 to 2½ lbs greater than those now reported (Table I). Much of this difference is represented by clothing, since the American children appear to have been weighed in indoor clothing, the nature of which was not described and for which no allowance was made. The difference between the mean weights tends to increase with age, particularly in females. Since the weight of clothing worn increases with age, this factor must be taken into account when attempting to make a comparison. Nevertheless, it appears probable that the mean weights of the American children are significantly

TABLE I

COMPARISON OF RESULTS WITH THOSE PREVIOUSLY PUBLISHED

(Difference from other results as percentage of means shown in appendix)

Sex			Male					Female				
Age (yrs)			3	3½	4	4½	5	3	3½	4	4½	5
Weight		Acheson and others (1955)	+1·86	+ 2·72	+3·23	+ 3·18	+1·86	+1·91	+ 1·16	+2·95	+ 0·83	+0·73
		Simmonds (1944)	+6·04	+ 6·16	+7·86	+ 7·21	+6·28	+6·54	+ 6·43	+7·17	+ 7·12	+6·76
		Low (1952)	−9·16	—	−8·14	—	−9·92	−3·50	—	−5·12	—	−7·41
	Paton and Findlay (1926)	Edinburgh	—	−12·44	—	−10·25	—	—	−10·30	—	−13·86	—
		Rural	—	− 0·47	—	− 2·68	—	—	− 1·83	—	− 5·43	—
Height	Crown-Heel	Acheson and others (1955)	Nil	+ 0·50	+0·29	+ 0·85	+0·09	+0·95	+ 0·41	+0·49	− 0·19	−0·37
		Simmonds (1944)	+1·73	+ 2·11	+2·04	+ 2·72	+2·10	+2·85	+ 2·37	+2·75	+ 2·65	+2·67
		Low (1952)	−4·22	—	−3·90	—	−4·13	−1·49	—	−1·79	—	−2·72
		Paton and Findlay (1926) Edinburgh	—	− 9·15	—	− 8·60	—	—	− 8·23	—	− 7·78	—
		Rural	—	− 1·71	—	− 1·89	—	—	− 5·18	—	− 3·04	—
	Crown-Rump	Simmonds (1944)	−0·37	− 0·01	−0·17	+ 0·55	−0·34	+0·13	− 0·22	+0·20	+ 0·03	+0·23
		Low (1952)	−5·69	—	−5·55	—	−7·23	−4·23	—	−5·83	—	−4·81
Intercristal Width		Simmonds (1944)	+5·5	+ 5·4	+5·2	+ 5·7	+3·9	+6·8	+ 6·4	+5·7	+ 5·1	+4·3
Occipito-Frontal Circumference		Low (1952)	−1·61	—	−1·08	—	−0·94	+0·02	—	+0·50	—	−0·34

greater than the mean weights now published, a view that is supported by the fact that the mean horizontal lengths reported by Simmonds are significantly greater than the supine crown-heel lengths now reported (Table I).

By contrast, there is no significant difference between the mean recumbent stem lengths found by Simmonds and the mean supine crown-rump lengths now reported (Table I). Since the limbs are lateral buds and represent lateral growth, it may be that the significant difference between the mean crown-heel lengths of these two groups of children is due to more rapid growth of the lower limbs in the American group. These differences find expression in the lower mean stem-stature indices* of the Brush Foundation data (Table II).

Further support for this inference is found in the comparison of the intercristal pelvic widths (Table I). Here, as with the crown-heel length, the means reported by Simmonds are significantly greater than those reported here. With the exception of the observation in males at 4½ years, there is, with increasing age, a progressive decline in the American excess in intercristal width (Table I).

Comparison with the data of Gray and Ayres (1931) for children of Chicago private schools yields a very similar result.

It is interesting to compare the present data with those of former years, especially if the former data refer to the same country or town, and comparison may be attempted with the observations of Low (1952) and those of Paton and Findlay (1926).

The mean data for weight and crown-rump length now given are all significantly greater than those recorded by Low. The mean supine crown-heel length at 3 years in both sexes is also significantly greater. At 4 and 5 years Low changed from a supine to an erect measurement, and the differences

* (Stem Stature Index = $\frac{\text{Crown-Rump Length}}{\text{Crown-Heel Length}} \times 100$)

TABLE II

MEAN STEM-STATURE INDEX

Age (yrs)		3				4				5			
Sex		Male		Female		Male		Female		Male		Female	
		Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean	S.D.
Simmonds (1944)		59·6	—	59·4	—	58·5	—	58·1	—	57·4	—	57·0	—
Low (1952)		59·9	1·59	59·2	1·30	58·6	1·50	58·0	1·83	57·3	1·64	57·0	0·93
Wallis (1931)		58·8	1·29	58·4	1·00	57·6	1·22	56·7	1·05	56·4	1·11	55·9	0·96
Present Inquiry	Cross Sectional	60·9	1·60	60·8	1·28	59·8	1·11	59·5	1·13	58·8	1·04	58·4	1·25
	Longitudinal	61·0	1·16	60·7	1·06	59·7	1·19	59·5	0·89	--	—	—	—

at 4 and 5 years have been ascertained after conversion to a supine length, using Palmer's formula (Table I). Their similarity to the difference at 3 years leaves little doubt that these differences are also significant. The mean occipito-frontal circumference now given for males is significantly greater than that given by Low, but by contrast there is no difference between the mean occipito-frontal circumferences for females. To what extent hair growth may be a factor here is an open question. It should be noted that, as in the present inquiry, Low made his observations on urban children.

Among other observations, Paton and Findlay (1926) recorded the mean weight and height at 3+, 4+, and 5+ years of Edinburgh children and the children of agricultural workers. The difference between the present data and those of Paton and Findlay are given in Table I. Comparison with the data of Paton and Findlay are less reliable than with those of Low. The age points are vague (*e.g.* 3+ means over 3 but not yet 4) and on this account 3+ and 4+ are compared with 3½ and 4½ in the present study. The weights reported by Paton and Findlay include indoor clothing, a point which must be noted when considering the amount of the difference shown. The erect heights reported by Paton and Findlay were converted to supine lengths by Palmer's formula before the comparison was made.

The norms of weight and erect height in use in Edinburgh Child Welfare Clinics were prepared by the late Dr. T. Y. Finlay, Maternity and Child Welfare Officer for the City of Edinburgh, when he collaborated with Paton and Findlay. These norms, which are undifferentiated for sex, may be compared with the present data, also undifferentiated for sex, and with Findlay's erect heights converted to supine lengths by Palmer's formula (Table III). This gives a more accurate measure of the change which has taken place in pre-school child growth in Edinburgh during the intervening 30 years.

TABLE III

PERCENTAGE DEFICIT SHOWN BY NORMS IN USE IN CHILD WELFARE CLINICS

City		Edinburgh		Paris			
Sex		Not Differentiated		Male		Female	
Measurement		Weight	Height	Weight	Height	Weight	Height
Age (yrs)	3	− 8·9	− 3·4	− 8·6	− 3·3	− 8·0	− 8·3
	3½	−10·3	− 5·1	− 9·9	− 2·8	− 8·7	− 9·1
	4	−10·2	− 6·0	−10·2	− 2·9	− 8·2	− 9·0
	4½	−11·5	− 6·4	−10·6	− 2·3	− 9·7	− 9·4
	5	−12·2	− 7·0	−11·8	− 2·7	− 9·5	− 9·6

Such findings suggest that comparison with the norms in use in the clinics of another city would be of interest. Graphic norms of weight and height are incorporated in the *Fiche Médicale* used in Paris for children from 2 to 6 years of age. In this instance the sexes are differentiated, but the source of the norms and when they were ascertained is not disclosed. Like the Edinburgh Welfare norms they are less than those now published (Table III). The amount of the difference is so great that, despite the difference in nationality, one suspects that the Paris norms, like the Edinburgh ones, are in need of revision.

The variability from the mean, as measured by the standard deviation, tends to increase with age. This is evident in the Height and Weight Tables of Acheson and others and the Tables of Low and of Simmonds. The trend is also present in this investigation in which the standard deviations are also influenced by the exclusion of children born prematurely and postmaturely.

Because the standard deviation is a measure of variability from a mean which is subject to variation, a longitudinal rather than a cross-sectional investigation might be expected to demonstrate the increasing variability more satisfactorily. Comparison of the standard deviations given in the longitudinal and cross-sectional Tables of Simmonds illustrates this point. It is to be noted however that Low's Tables, though compiled from a longitudinal survey with observations made at the relatively long interval of one year, do not show an increase in variability at every age point. Variability does not appear to have a sex bias. The Tables of Low display no sex bias in the standard deviations and none has been observed in the present inquiry. No sex bias is shown by Simmonds's Tables and, though Acheson and others record greater standard deviations for the heights for males, the contrary is reported by Simmonds.

INFLUENCE OF SEX.–In common with the present findings, most investigators of growth in this age-period report greater mean measurements for males than for females. They include Acheson and others, Simmonds, Paton and Findlay, Gray and Ayres, and Fleming (1933). Some, however (notably Low, 1952, and Hammond, 1955) have reported contrary findings, and whereas in the case of Hammond the small number of observations is probably the explanation, there is no obvious explanation in the case of Low.

The influence of sex in this age-period is not equable, there is a decline in the male excess in all measurements as age increases (Table IV, opposite).

TABLE IV

MALE EXCESS EXPRESSED AS A PERCENTAGE OF FEMALE MEAN

Age (yrs)	Weight	Length		Occipito-Frontal Circumference	Intercristal Width
		Crown-Heel	Crown-Rump		
3	0·39	0·23	2·03	3·03	2·19
3½	0·33	0·16	1·78	2·40	2·46
3½	0·29	0·11	1·27	3·13	1·93
3¾	0·19	0·06	0·53	2·29	0·85
4	0·29	0·14	1·78	3·07	1·99
4¼	0·13	0·04	0·07	2·10	1·36
4½	0·10	0·02	0·03	1·44	0·94
4¾	0·15	0·02	0·04	1·96	0·52
5	0·19	0·05	1·07	1·91	1·71

The greatest reduction is in the crown-heel length which at the age of 5 years is virtually the same in males and females. Simmonds also made this observation, which is corroborated by reference to the Tables of Fleming. This finding is not universal and the most outstanding contrary publication is provided by the height norms of the Paris Welfare Clinic record-card, which shows a greater difference between the mean heights of males and females at 5 years than at 3 years. This may be deduced from Table IV, but in considering this table, it must be remembered that these data are the differences between means which are subject to some variation. On this account the general trend of the differences is more important than the individual differences.

Sex influences the mean stem stature index which in general is lower for females than for males (Table II). Few investigators give computations of the mean stem stature index from raw data. Derived from means, Simmonds gave a graphic representation which shows the consistently lower female mean index. Calculations from the raw data on an adequate number of observations were given by Wallis (1931) and by Low, and now in the present data. All agree that females have consistently lower mean indices. In addition, the mean stem-stature index computed from the raw data of forty males and 35 females who were observed at 3 years and 4 years each ± 7 days is given in Table II. This shows a lower mean index for females and confirms that the mean stem-stature index falls with increasing age. It must not be assumed from this, however, that the stem-stature index of the individual child consistently falls with increasing age. Of the forty males and 35 females aforementioned, the index is higher at 4 years for five males (12·5 per cent. and two females (5·7 per cent.). Low gave higher indices at 4 years for nine males (13·6 per cent.) and three females (5 per cent.). The differences between these percentages of the sexes are not of statistical significance, but may reflect the influence of sex.

It is perhaps as well to mention that indices such as this are representative of proportions and throw no light on size and rate of growth. Low and Simmonds both give the same mean stem-stature index for children of the same age (Table II) though the raw data from which the indices are calculated are much lower in the case of Low.

INCREMENTS.—Quite commonly, increments of height and weight are estimated by noting from a Table the difference between means at different age points. Such data, abstracted from cross-sectional Tables, may be less accurate than those taken from longitudinal Tables, but in practice there is very little difference. Simmonds gives both cross-sectional and longitudinal Tables for height.

Ascertainment of the rate of growth by this method lacks an expression of variability of increment. This can only be obtained from analysis of individual increments. Accordingly, the data of the present inquiry were scrutinized for observations made upon children at two consecutive age points. The numbers, though relatively small, are enough to make a computation of quarterly height and weight increments worth while. These are given in Table V, which is cross-sectional.

TABLE V

HEIGHT AND WEIGHT INCREMENTS

Sex		Male							Female						
Measurement		No. of Children	Weight (oz.)			Length (mm.)			No. of Children	Weight (oz.)			Length (mm.)		
			Mean	S.D.	C.V.	Mean	S.D.	C.V.		Mean	S.D.	C.V.	Mean	S.D.	C.V.
Age (yrs)	3 –3¼	44	16·2	12·2	75·3	19·1	6·0	31·4	33	15·1	8·9	58·9	20·3	8·6	42·4
	3¼–3½	54	20·5	11·7	57·1	18·8	5·2	27·7	49	20·7	14·3	69·1	20·0	5·6	28·0
	3½–3¾	49	16·7	17·1	102·3	18·3	6·4	35·0	62	18·3	14·2	77·6	18·5	5·6	30·3
	3¾–4	44	13·1	11·4	87·0	17·4	5·9	33·9	47	18·9	12·1	64·0	16·2	6·1	37·7
	4 –4¼	38	16·4	11·4	69·5	16·1	5·7	35·4	47	16·1	13·5	83·9	16·7	5·6	33·5
	4¼–4½	30	19·7	12·1	61·4	15·4	6·3	40·9	46	19·4	14·7	75·8	16·6	6·2	37·3
	4½–4¾	42	14·2	12·6	88·7	16·9	4·9	29·0	45	16·4	12·0	73·2	15·9	5·6	35·2
	4¾–5	47	15·7	13·1	83·4	13·8	5·7	41·3	48	15·7	11·2	71·3	15·4	5·8	37·7

The great variability of weight increment disclosed suggests that prediction of weight increment is somewhat hazardous. Indeed, it has been shown (Thomson, 1956b) that a weight measurement at 3 years of age cannot be used to predict what the measurement will be at 4 years of age.

Variation in the crown-heel length increment, is also considerable. It requires approximately ± 70 per cent. of the mean increment to cover 95 per cent. of the observations (Table V). The variability of the crown-heel increment is more uniform than that of weight increment and is much smaller. This is so despite the greater difficulty in measuring length accurately and, in general, inaccuracy increases the variability. It is however, well recognized that length is less affected by environmental factors. This is in keeping with the finding of Robinow (1942), who unfortunately did not distinguish between the sexes. The crown-heel mean increments are of further interest, in that, in both sexes, there is a decline with an increase in age, and with two exceptions, the female mean increment exceeds the male. As with weight, it has been shown that a crown-heel measurement at 3 years bears no relation to the ensuing year's increment. Thomson (1956b).

Summary

(1) Based on 947 sets of observations of males and 971 sets of observations of females, means with standard deviations for weight, supine crown-heel and crown-rump lengths, occipito-frontal circumference, and intercristal pelvic width of Edinburgh children at quarter-year intervals from 3 to 5 years are presented. The observations were made on healthy legitimate singleton children who were neither prematurely not postmaturely born.

(2) The mean measurements in the report are greater than those of Paton and Findlay (1926) or Low (1952), while the mean weights and crown-heel lengths are appreciably greater than the means in use in Edinburgh and Paris Welfare Clinics. This suggests that the Welfare Clinic norms may be in need of revision.

(3) The mean measurements for females are less than the corresponding mean measurements for males. The male excess diminishes with increasing age, until at 5 years in the case of the crown-heel length there is no appreciable difference between the sexes.

(4) The mean stem-stature index for females is consistently lower than that for males even at the age of 5 years, when the crown-heel lenght is approximately the same in both sexes.

(5) The variability of weight increment at quarter-year intervals is greater than the variability of crown-heel increment, despite the greater difficulty in measuring length accurately.

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Appendix Table A

Mean Weight

Sex..	Male					Female				
Age (yrs)	No. of Children	Mean (lb.)	S.D.	Mean (kg.)	S.D.	No. of Children	Mean (lb.)	S.D.	Mean (kg.)	S.D.
3	109	31·62	3·06	14·34	1·39	101	30·44	3·62	13·81	1·64—
3¼	111	32·91	2·53	14·93	1·15	102	31·87	3·48	14·46	1·58
3½	108	33·77	3·33	15·32	1·51	117	32·83	3·64	14·89	1·65
3¾	108	34·41	3·65	15·61	1·65	114	33·78	3·87	15·32	1·76
4	112	35·60	3·82	16·15	1·73	109	34·58	4·04	15·68	1·83
4¼	91	36·36	3·42	16·49	1·55	102	35·90	3·86	16·29	1·75
4½	99	37·74	3·88	17·12	1·76	115	37·37	4·89	16·95	2·22
4¾	99	38·43	4·03	17·43	1·83	103	37·92	4·27	17·20	1·93
5	110	40·26	4·55	18·26	2·07	108	39·49	4·64	17·91	2·11

APPENDIX TABLE B

MEAN LENGTH

Length	Supine Crown-Heel								Crown-Rump							
Sex ..	Male				Female				Male				Female			
Age (yrs)	Mean (in.)	S.D.	Mean (mm.)	S.D.	Mean (in.)	S.D.	Mean (mm.)	S.D.	Mean (in.)	S.D.	Mean (mm.)	S.D.	Mean (in.)	S.D.	Mean (mm.)	S.D.
3	37·78	1·54	959·5	39·2	36·94	1·38	938·3	34·9	22·98	0·91	583·7	23·2	22·52	0·84	572·1	21·3
3¼	38·63	1·33	981·2	33·8	38·01	1·44	965·5	36·4	23·38	0·76	593·9	19·2	22·97	0·86	583·5	21·9
3½	39·16	1·39	994·8	35·4	38·76	1·38	984·4	35·2	23·58	0·75	599·0	19·2	23·29	0·86	591·5	21·9
3¾	39·78	1·55	1010·3	39·5	39·53	1·39	1004·0	35·3	23·79	0·91	604·3	23·2	23·67	0·91	601·1	23·2
4	40·56	1·45	1030·2	36·7	40·01	1·51	1016·2	38·3	24·26	0·87	616·1	22·0	23·83	0·89	605·3	22·5
4¼	41·07	1·55	1043·1	39·5	40·90	1·52	1038·8	38·7	24·35	1·01	618·5	25·7	24·17	0·88	613·9	22·4
4½	41·61	1·73	1056·8	44·0	41·51	1·58	1054·5	40·2	24·63	0·99	625·7	25·2	24·55	0·97	623·6	24·7
4¾	42·30	1·66	1074·4	42·2	42·22	1·46	1072·4	37·1	24·90	0·97	632·4	24·6	24·80	0·91	630·0	23·2
5	43·12	1·79	1095·2	45·6	42·90	1·46	1089·6	37·2	25·33	1·03	643·4	26·2	25·06	0·88	636·6	22·5

APPENDIX TABLE C

MEAN GIRTH

Measure-ment	Occipito-Frontal Circumference								Intercristal Pelvic Width							
Sex ..	Male				Female				Male				Female			
Age (yrs)	Mean (in.)	S.D.	Mean (mm.)	S.D.	Mean (in.)	S.D.	Mean (mm.)	S.D.	Mean (in.)	S.D.	Mean (mm.)	S.D.	Mean (in.)	S.D.	Mean (mm.)	S.D.
3	19·81	0·48	503·1	12·2	19·22	0·50	488·3	12·8	6·26	0·29	159·0	7·2	6·12	0·33	155·6	8·4
3¼	19·84	0·48	504·0	12·3	19·38	0·54	492·2	13·6	6·40	0·28	162·5	7·2	6·24	0·34	158·6	8·7
3½	19·87	0·47	504·8	12·0	19·27	0·52	489·5	13·1	6·45	0·30	163·9	7·5	6·33	0·33	160·8	8·3
3¾	19·87	0·56	504·7	14·3	19·42	0·48	493·4	12·3	6·51	0·31	165·4	7·9	6·46	0·34	164·0	8·6
4	19·98	0·44	507·4	11·2	19·38	0·51	492·3	13·1	6·67	0·31	169·3	7·9	6·54	0·35	166·0	8·9
4¼	19·95	0·48	506·8	12·1	19·54	0·60	496·4	15·4	6·72	0·32	170·8	8·1	6·63	0·31	168·5	8·0
4½	19·96	0·54	507·0	13·7	19·68	0·52	499·8	13·3	6·80	0·34	172·7	8·7	6·74	0·38	171·1	9·7
4¾	20·06	0·54	509·6	13·7	19·68	0·51	499·8	13·0	6·82	0·33	173·3	8·3	6·79	0·38	172·4	9·7
5	20·15	0·50	511·9	12·6	19·77	0·53	502·3	13·5	7·02	0·34	178·7	8·6	6·92	0·37	175·7	9·5

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FREQUENCY OF EPILOIA IN NORTHERN IRELAND

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In the past five years a strenuous attempt has been made to ascertain all the cases of epiloia in Northern Ireland. The Special Care Service (responsible for all aspects of mental deficiency and maintaining a central registry), the mental hospitals, children's hospitals, neurologists, paediatricians, and dermatologists have all co-operated in finding cases and all suspected cases have been reviewed.

We finally ascertained nine living cases (three males and six females) in eight families. None of the thirteen living parents, who were all examined, show any signs of the trait, and none of the parents are known to be related in any way. All but four of the 29 brothers and sisters of the affected subjects were seen, but it was possible to see only a small proportion of the sibs of the parents, because of deaths and movements overseas or because the parents were not willing for their sibs to be visited. The numbers seen are indicated in brackets in Table II. No history was obtained of major skin stigmata and their occupations do not suggest mental defect. Seven of the cases are single sporadic cases, but in the eighth family there is one definite case and one highly suspicious case which we feel should be regarded as affected although the diagnosis may not be certain for a number of years because the only symptoms so far noted are epileptiform convulsions. The essential clinical features of these cases are set out in Table I.

It will be seen that all for whom we have a reasonable history started with convulsions in infancy or early childhood and that the cutaneous signs which clinched the diagnosis came on in childhood. In family E.7 our information is incomplete, as the patient has been in a mental hospital for many years and has no living relatives, and the original clinical notes are scanty. A neighbour who knew her parents and a surviving step-father do not know of any dullness or skin signs in the parents.

In family E.8 the male propositus was recognized in the Royal Belfast Hospital for Sick Children when his epileptiform convulsions were being investigated. The small sister, who has fits, has as yet no cutaneous stigmata but is provisionally accepted as being affected. The affected girl in family E.6 is one of some interest, in that in spite of having typical

TABLE I

CLINICAL FEATURES OF CASES ASCERTAINED

Family No.	Age at Onset	Mode of Onset	Sex	Signs, Symptoms, and Progress	Intelligence
E 1	6 weeks	Convulsions	F	Adenoma sebacum, mild epileptic fits, patches of leucodermia	Imbecile
E 2	5 weeks	Convulsions	F	Adenoma sebacum, major epileptic fits, small telangiectatic spots on trunk	Feeble-minded
E 3	4 years	Convulsions	M	Adenoma sebacum, severe fits	I.Q. 65
E 4	11 months	Convulsions	M	Adenoma sebacum, moderate fits, patches of leucodermia, severe telangiectasis on face	Low-grade imbecile
E 5	12 weeks	Convulsions	F	Adenoma sebacum, moderate fits, red blotches on skin, enlarged thyroid	High-grade imbecile
E 6	6 months	Convulsions	F	Adenoma sebacum, raised leucodermic patches on flanks, mild epileptiform fits, petit mal	Normal intelligence (I.Q. 108)
E 7	Not known	Not known	F	Adenoma sebacum, telangiectasis, no convulsions, gross obesity	Imbecile
E 8	4 months	Convulsions	M	Adenoma sebacum, convulsions, whitish perle patches on skin, well-marked phakoma on each fundus with gliomatous nodular outgrowth from optic nerves, possibly some early cystic change in parietal region of skull	Retarded to unknown degree
	6 months	Convulsions	F	Convulsions only	Not known

convulsions and skin lesions she is of normal intelligence and passed her qualifying examination at age 11.

Table II sets out the genetical data relevant to the families. The ages of the parents in E.7 are approximate and are as given by the surviving step-father of the subject. The parents of the affected subjects are not known to be related to one another.

The data are too few to form any conclusions about parental age, although the mean paternal age (34·3 yrs) and maternal age (32·1 yrs) of the seven sporadic cases seem high. Any ascertainment must be incomplete and any estimates made of gene frequency and mutation rates must be minimal for the following reasons:

(1) Mild cases, which are sporadic or represent the only living cases in the present generation, are impossible to ascertain. (Possible cases from the records of the dermatological clinics have been followed up, but many may not attend such clinics).

(2) Among the known cases of epilepsy in young children there may be at any given time children who will subsequently develop skin stigmata but who cannot be recognized until that time.

(3) It is well known that typical tuberose sclerosis is recognized from time to time at *post-mortem* examinations in subjects who could not have been identified during life.

(4) Most severely affected epiloics die relatively young; E.7—aged 40 years when seen—is an exception.

As Penrose (1949) has pointed out, many families with normal parents and more than one affected child have been described, and in some of these, parents have been related. The possibility that there is a recessive gene or alternative allele which can cause the condition cannot therefore be excluded.

It would seem that the number of cases is so small and the proportion of the genotypes ascertained so problematical as to make an estimation of mutation rates from these scanty data almost impossible. The justification for recording them is that there appears to have been no previous complete ascertainment of all the cases in a community.

The estimated population of Northern Ireland at the present time is 1,387,000, so that the ascertained case frequency is about 1/150,000.

We are indebted to the Medical Superintendents of the Mental Hospitals in Northern Ireland and to Dr. T. W. H. Weir, of the Special Care Service for much help in ascertaining cases.

REFERENCE

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TABLE II

DATA OF GENETICAL INTEREST RELATING TO AFFECTED SUBJECTS*

Family No.	Affected Subject			Number of Unaffected Sibs			Sibs of Father			Sibs of Mother			Ages of Parents when Affected Subject was Born (yrs)	
	Age when Seen	Sex	Birth Rank	Males	Females	Mis-carriages	Males	Females	Total	Males	Females	Total	Father	Mother
E 1	20	F	1	—	2 (2)	—	1	1 (1)	2	4	4 (2)	8	26	31
E 2	24	F	1	3 (1)	2 (2)	—	—	—	—	1	7 (2)	8	21	21
E 3	20	M	6	—	3 (3)	2	2	3	5	6 (1)	6 (3)	12	42	40
E 4	18	M	2	6 (5)	4 (4)	—	3	3 (1)	6	2 (1)	2 (2)	4	29	27
E 5	18	F	2	2 (1)	—	—	—	3	3	—	4	4	35	30
E 6	12	F	1	—	2 (2)	—	6 (1)	1 (1)	7	6	3 (1)	9	43	40
E 7	40	F	1	—	—	—	?	?	?	?	?	?	44	36
E 8	6 1	M F	3 8	—	5 (5)	1	3	1 (1)	4	2 (1)	2 (1)	4	32 38	27 33

* Figures in brackets indicate sibs seen

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ORGANIZATION OF A HOSPITAL WORKSHOP FOR CHRONIC PSYCHOTIC PATIENTS

BY

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INTRODUCTION

The part that regular and useful work can play in preventing deterioration in patients who are obliged to spend long years in mental hospitals has long been recognized. Nevertheless, it has required the exertions of a succession of outstanding clinical psychiatrists—such as Pinel (1801), Conolly (1856), Esquirol (1838), Browne (1837), Kirkbride (Bond, 1947), Hill (1839), Charlesworth and Ellis (Granville, 1877), in the 19th century, and Bleuler (1911), Simon (1927), Schneider (1939), and Barahona Fernandes (1954), in more recent years—to remind us of the importance of this concept.

There is also reason to believe that an inactive régime can contribute to the deterioration of chronic patients, by fostering "institutionalization", as described by Martin (1955). This phenomenon has often been discussed in psychiatric literature, but the process has never been studied systematically in mental hospital patients. Studies carried out with inmates of prisons have suggested ways in which to counteract the demoralizing effects of prolonged incarceration. For example, Horsch and Davis (1938) and Driscoll (1952) have shown that a high degree of conformity to the institutional regime is related to social and personal maladjustment, rather than to good mental health. Fenton (1952) noted that the majority of short-term prisoners and a significant proportion of "old lags" were potentially responsive to measures of re-socialization. In describing how best these are to be applied, he emphasized the need for prison workshops incorporating features which have been shown to raise morale in industry. His conclusions—"The prison as a whole, not merely particular shops, must develop the atmosphere of adjustment" and "It is unfair, until in the walled prison the prerequisite atmosphere of adjustment is present, to attribute to defects or limitations in the personalities of the inmates any deficiencies in their willingness to accept treatment"—are very relevant to current experiments in the rehabilitation of chronic psychotic patients.

One reason for the periodic neglect of work therapy in hospital may be that it was never clearly established whether the therapeutic gains were due to specific measures or to the personality and drive of the doctors concerned. Vigour and enthusiasm on the part of the doctor are likely to enhance the success of any therapy, and it is essential to attempt an objective examination of the techniques involved. The present paper reports the preliminary stages of such a study carried out in Banstead Hospital, Sutton, Surrey.

MATERIAL

The patients were twelve men, aged between 26 and 46. All were diagnosed as schizophrenics, but examination of the records showed that in three cases there was evidence of other pathological factors in the history, *viz.* post-encephalitic personality disorder, cerebral syphilis, and epilepsy. Duration of stay in hospital since admission varied from 4 to 22 years, (mean 7·5 years, but if one individual is excluded, 6·2 years). All except one were certified patients.

THE WORK AND ITS SETTING

In June, 1955, an industrial workshop for these twelve male chronic psychotic patients was opened in a large well-lit room in a disused corridor of the main hospital building. The only furniture required was a table and two chairs for each pair of men. An empty adjoining room served as a store for raw materials and for the finished product, and another as the supervisor's office. The supervisor, an elderly man recruited from the local labour exchange, was selected after interview because he showed a ready grasp of the aims of the rehabilitation process, firm but good-natured disciplinary leadership, and a minumum of preconceived ideas about the capabilities or handicaps of psychotic patients. He had never before been inside a mental hospital.

The work consisted in folding, glueing, and packing cardboard containers (egg-boxes, cake-boxes, etc.). The

"raw materials" consisted of stamped and printed flat cardboard sheets; the "finished products" were parcels of from 250 to 1,000 containers packaged and labelled for dispatch to their several purchasers. This work is usually carried out in factories, or by out-workers. It is done by hand (for the most part by female labour) only where short runs of up to 200,000 of each article are demanded; in the case of larger orders it becomes more economical to tool up for machine production.

Box-folding is a repetitive, relatively unskilled task, which calls for application and dexterity rather than for any special training. It is not lucrative work; on the existing rates, agreed by the relevant wages council, an average worker earns only a little more than 2 shillings an hour. For the purposes of the present study, however, it had several advantages:

(*i*) it required no equipment other than spring clamps to hold the folded containers, and these were provided by the factory;

(*ii*) it provided individual work, in units which could be counted, to provide a measure of each patient's daily output;

(*iii*) it was available in sufficient quantity from a firm which has already had several years' experience of dealing with a sheltered workshop in a mental deficiency hospital.

Observations

Level of Work.—Before the workshop was instituted, an experiment was carried out with eight male long-stay patients, diagnosed as paranoid schizophrenics, and aged 40 to 44 yrs.

They were given a simple repetitive task (sorting buttons of three sizes) and their rate of work was measured at 2-minute intervals. One of these patients protested at the interruption of his accustomed daily routine and refused to attend after the first week. The rest showed certain features in common. Their initial rate of work was much below that of a control group of normal men of the same age and similar intelligence level, and improved more slowly—but it continued to improve. Whereas the controls had "levelled off" at a fast rate of work after 7 days' practice, the patients levelled off only after 28 day's practice; by this time four of the patients had achieved the same rate as the controls, and the remaining three patients were working at 85 per cent. of that rate (O'Connor, Heron, and Carstairs, 1956).

It was concluded that long-stay patients could be expected to start much below the normal level of industrial output, but that given time they would slowly approximate towards that level. An important factor in sustaining this slow improvement was believed to be the offering of an incentive; and the simplest incentive is money. Accordingly, from the outset of the workshop trial, it was made clear to the patients that the money earned by their efforts would be distributed among them according to their output.

Response to Money as an Incentive.—It was soon clear that the opportunity to earn a few shillings a week was a potent incentive for long-stay patients. The patients remarked upon the amount of their earnings and took note of differences in the rewards of various members of the group. It was noted that on pay-day even the most autistic patients would talk relevantly and sensibly about their money and would discuss among themselves the resources of the hospital shop. For a time, their delusional pre-occupations ceased to dominate their attention.

As the previous experiment had suggested, the patients began work at a slow pace, and earnings were correspondingly low. During the first 3-week period the total earnings of the group averaged £5 each week, during the next 3-week period it was £7 17s., during the third £9 5s. 6d., and during the fifth £11 14s. After this the weekly earnings remained at between £9 and £10, although one of the best workers was absent for much of the time. These are extremely low earnings for a task at which twelve normal young women, working for a comparable number of hours, could expect to earn at least £24 per week.

This result might be due to incapacity, or to lack of incentive; but the former is an unlikely explanation in view of the experiment previously reported. An inspection of the individual pay-sheets showed that, during the last 3 weeks, seven of the twelve men earned £1 each. Four of them had previously frequently exceeded this figure; the other three had laboriously climbed towards it. The arrest of their earnings at this figure of £1 per week was not due to chance, but to the National Insurance Acts. A patient in hospital is permitted to earn sums up to £1 per week, while carrying out "work which is undertaken under medical supervision as part of his treatment". As soon as he exceeds this limit he forfeits his residual Sickness Benefit (7/6 per week, for most of our patients) and becomes liable to pay a weekly contribution of 8/5 as a self-employed person.

These regulations had been explained to the patients. It was pointed out that if they could increase their output to earn over £1 16s. 0d. per week, they could become self-employed persons and continue to earn more pocket-money. In effect, however, the prospect of working harder in order to pay taxes and forfeit benefits did not appeal to them.

In this situation, the existing regulations (intended no doubt to safeguard against abuses of social benefits) are an effective deterrent. This obstacle will only be overcome if patients can be offered a more remunerative form of work, or if the "permitted earnings" limit is raised.

INDIVIDUAL VARIATIONS IN WORK LEVEL.—Four patients early revealed themselves as the most productive members of the group. The best of them was soon entrusted with the task of packaging the finished work for the entire workshop. The remaining three, in 23 consecutive weeks in which individual totals were noted, scored the highest weekly output of the group on 7, 6, and 10 weeks respectively. Three others were consistent in their output, but at a slighly lower level. The remaining five patients showed very considerable fluctuations; with one exception, each man in the last group showed that when working at his best he could exceed the average output of those in the previous group, but that he could not sustain this level. The one exception also showed fluctuations in work level, but with a lower best performance; this individual differed from the rest in two other respects: he had had the longest period of hospitalization, and he had a history of epilepsy.

It was anticipated that schizophrenic symptoms might interfere with the performance of some patients, since a psychiatric examination carried out at the beginning of the trial period showed that ten of them currently exhibited delusions, hallucinations, or misinterpretations, and the two others gave evidence of similar experiences in the past. However, a day-by-day record of events in the workshop indicated that, provided that the patients came to the workshop (one patient's attendance was interrupted for a period of 6 weeks, and three others were absent for a total of 5 single days for reasons attributable to their mental illness), the continuance of their symptoms appeared to interfere only to a minor extent with their application to work.

Occasionally, disturbed behaviour on the part of one or other of the patient-workers was sufficiently disruptive to be recorded in the diary of events. Such incidents were rare and concerned only three of the twelve patients. A total of eight incidents was noted for the 6-month period: five were associated with one patient, two with a second, and one with a third man.

In one instance an hallucinated schizophrenic suddenly struck a nearby worker. In a subsequent interview this patient pointed out that the man he had assaulted kept talking aloud and that on this particular occasion he was simultaneously moving his foot, thereby seeming to kick what he was saying into the patient's head. This had made the patient very angry and he had therefore retaliated. At a later date, the same patient began swearing loudly for no apparent external reason in a manner which upset nearby workmates. Interview disclosed that this was a reaction to intrusive hallucinations and passivity phenomena. An attempt was made to convey a sympathetic understanding of these abnormal experiences, but the patient was nevertheless informed that behaviour of this kind could not be permitted in the workshop because of its effect on other patients. He was advised to take a walk in the grounds whenever he felt impelled to respond in this fashion. From this time the patient seemed able to contain himself despite continuing provocation, and he never did retire to the grounds.

The greatest number of incidents was associated with an irascible paranoid schizophrenic who was disposed to react promptly and vehemently to real or imagined injury or injustice. His aggression was mainly verbal, though on one occasion he angrily hurled a piece of cheese through an open window. Another time he threatened to hit a patient who was responding to his own hallucinatory experiences by continual swearing. This man's outbursts were treated in the same manner as those of the hallucinated patient mentioned above; he was taken aside and given an opportunity to express his current grievance, which he did vehemently. Any well-founded complaints were acted upon, but on the other hand the doctor made it plain that he did not accept all the patient's misinterpretations and could not permit violent behaviour. These interviews appeared to dissipate much of the patient's resentment and helped him to resume his place as the most industrious worker in the shop.

Another patient showed a tendency at times to sit idly drawing and smoking, occasionally laughing foolishly or shouting obscene abuse directed at no particular object.

At no time was the tenor of work in the factory substantially affected for more than a minute or two by such incidents.

IMPROVEMENT IN SOCIAL BEHAVIOUR.—At the start of this experiment four of the patients were under constant surveillance, requiring to be escorted to and from the locked wards in which they lived. Two of these patients had histories of repeated attempts to escape; the two others were regarded as liable to wander off in a disoriented manner. After 2 months' attendance at the workshop it was noted that none of these patients was now escorted to and from work. The two "escapers" had both been transferred to

open wards, and the two others had shown themselves able to proceed to and from work on their own.

Seven patients were lodged in locked wards at the beginning of the experiment, although three of them had limited "corridor parole" privileges at certain hours. After 6 months, four of the seven had been transferred to open wards. No patient was downgraded in respect of parole status during this time. These changes in status were effected by the ward doctors, purely on the evidence of the patients' generally improved level of behaviour: they were not instigated by those in charge of the workshop.

During the 6 months following the period under review, the twelve subjects were joined by twenty more men and thirty women patients, in an expansion of the workshop programme. One year after the commencement of the first experimental group the position of the twelve was as follows: three had been discharged (including the man with 22 years' stay in a succession of hospitals), one had absconded and remained at large for the period necessary for his certification to lapse, seven were in open wards and working regularly, and one remained in a closed ward although still attending the workshop.

CHANGES IN PATIENTS' SOCIAL ENVIRONMENT.—It should be noted that this experiment was carried out in a hospital which was in a process of change. A vigorous treatment policy was being combined with a drive to improve the amenities and wherever possible to increase the amount of freedom accorded to patients. Against the background of these general changes in the hospital environment must be set the particular changes in the social field of each participating patient. Not only did he attend the workshop and associate with the others in productive work: he also became recognized by the staff and other patients in his ward as one of those gainfully employed in the "box factory", so that their attitudes towards him were correspondingly modified.

Many of these wider social influences defied precise observation. One was aware of a widespread interest among the nursing staff in the progress of the workshop; and also of not a little hostility towards this innovation, some of which found expression in teasing the working patients, making fun of their allegedly high earnings, etc.

Two studies were carried out to obtain more detailed observations upon the patients' wider social environment. The first (Carstairs and Heron, 1956) completed during the early weeks of the 6-months' pilot experiment, consisted of an opinion survey carried out with 210 male members of the hospital staff (including staff of all ranks and occupations, from the Medical Superintendent to the scullery hands) in order to ascertain their attitudes toward mental patients, evaluated in terms of "custodialism *versus* humane treatment" and degrees of authoritarianism. It was apparent that the most "custodial", and to a less extent, the more "authoritarian" attitudes were to be found among older men in the lower ranks of hospital employment: among those, in fact, with whom patients most often come into contact.

The second study (O'Connor, Carstairs, Rawnsley, 1956) carried out at the conclusion of the 6 months' period, consisted of an inquiry into the extent to which information about the workshop, and interest in it, had permeated the entire population of male long-stay patients in the hospital. 560 patients were given a brief interview in which they were asked whether they had heard of the "box factory" (as the workshop is known in the hospital), and if so whether they had heard of it from a staff member or from a fellow-patient. Questions were also put to elicit their attitude to the workshop project, and finally they were asked whether they would like to take part in it.

Analysis of the responses showed that 37 per cent. of these patients had heard of the workshop. The proportion who had done so was higher in the open wards (49 per cent.) than in the closed wards (29 per cent.). On the other hand, the number of patients who expressed a desire to enter the workshop exceeded the number who claimed to have heard about it, and in this case a higher proportion of volunteers came from the closed than from the open wards (55 per cent. and 33 per cent. respectively).

SUMMARY

During the initial trial of an industrial workshop in which mental hospital patients were paid for their work, some problems were answered and others raised. It was shown that many long-stay patients are capable of reaching normal levels of rate of work at comparatively unskilled tasks. That normal output is not achieved is due to lack of incentive rather than to lack of capacity, and patients showed ready acceptance of money as an incentive. Regular attendance at the workshop was accompanied in many cases by an appreciable improvement in patients' social behaviour: this was most marked in those whose previous behaviour had been least satisfactory. It was recognized that attendance at the workshop was only one among a number of social interactions in which patients were involved.

Attempts were accordingly made to obtain measures of two accessory social influences, namely the attitude of staff towards patients, and the degree of

intercommunication between long-stay patients in the hospital. It is suggested that, if industrial work is to be further developed as an instrument for the social rehabilitation of chronic psychotic patients, planned social incentives will be required to supplement the financial one. This will especially be the case if patients who are initially negativistic or indifferent are to be successfully involved in such a programme.

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THE USE OF A GENERAL PRACTITIONER'S TIME

BY

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In his presidential address to the Royal Statistical Society in 1951, Professor Bradford Hill gave details of a survey of the day's work of a doctor, based on records kept by doctors during the 12 months which ended July 1, 1939. The two main indices were attendances of patients at the doctor's surgery and visits by the doctor to *insured* patients, and variations were examined by day, week, and month. The same indices have also been used in surveys of the work of individual practitioners (McGregor, 1949; Pemberton, 1949; Fry, 1952). In an analysis of clinical records of eight practices, Logan (1953) measured morbidity by recourse to a *consultation rate;* Crawford (1954) in a survey of a practice in Northern Ireland conducted over a 2-year period used *spell of illness.*

These surveys provide no detailed knowledge of the use of a doctor's time, the subject considered in the present report. It is by no means easy to obtain information on this matter without undue interference with the routine of practice. The time spent with each patient is not normally recorded, and it is difficult to assess in respect of administrative and professional work not directly concerned with the care of patients.

Material and Methods

The practice which is the basis of this study is in the charge of two partners. Its features are:

(*a*) location in a suburb of a large city;

(*b*) a high proportion of patients who are "black-coated workers" or members of the higher income groups;

(*c*) a static population with a relatively high rate of inter-marriage;

(*d*) a relative absence of poor social conditions;

(*e*) inclusion of two residential schools (the Birmingham Blue Coat School and a Home Office School) and a home for the Aged (St. Joseph's Home).

The inquiry, which is concerned only with patients treated by one partner (D.L.C.), began on April 14, 1953, and lasted 12 months; the Easter vacations in 1953 and 1954 were therefore excluded. Only National Health Service patients were considered, chiefly because there was no reliable list of private patients. There were 6,565 patients on the combined list of the two partners on April 1, 1953, and 6,690 patients on April 1, 1954 (excluding patients living at the residential schools and old people's home). The average number of patients at risk for the 12 months of the survey wes 6,628.

At the time of this inquiry, figures obtainable from the Executive Council were known to be inflated by the inclusion of patients who had recently died or left the district, and it was not possible to contact every patient personally. Age and sex distribution of patients on the combined list was therefore estimated from a representative sample (the first 800 names in alphabetical order). Both partners recorded the number of episodes of illness treated and the number of patients in each of the age groups specified below. The number of patients in each age group for whom one partner (D.L.C.) was responsible was calculated by assuming that, in any particular age group, patients treated by each partner suffered the same number of episodes of illness in a given time. Except for a somewhat larger proportion, especially of females aged 65 years and over, the age distribution of patients is very similar to that of the populations of Birmingham and of England and Wales.

A punch-card was completed for each doctor-patient "contact"; a contact comprised either an attendance by the patient at the surgery or a home visit to the patient. The time spent on each "contact" was recorded, and the total time spent on all "contacts" with each patient was calculated at the end of each "episode".* The total number of surgery attendances and the total number of home visits which took place during each episode we also recorded. If a patient suffered from an illness in which periods of normal health were broken by recurring spells of ill-health, each new spell of illness was classed as a separate episode. Other items of information included the patient's age, sex, and marital state, the diagnosis, and the degree of severity of the illness.

In previous surveys of single practices, broad classifications of illness derived from the W.H.O. nomenclature of diseases have been used. The W.H.O. classification is, however, less suitable for use in general practice than in hospital, because the incidence of serious illness is relatively much lower, and an alternative method was employed which involved separate recording of the system most affected and the type of lesion.

*An "episode of illness" is taken as the basic unit of medical care and covers the period of ill-health from onset to conclusion.

TABLE I

USE OF PRACTITIONER'S TIME (HOURS PER WEEK)

Year			1953									1954			Average
Month			April*	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	
Time Spent	In Contact with Patients	At Surgery	14·0	13·1	12·8	11·6	7·0	13·2	14·0	15·0	13·0	15·3	15·2	16·9	13·4
		At Patients' Homes	6·6	5·8	7·4	4·9	5·0	8·1	9·1	7·0	5·4	7·4	8·0	8·5	6·9
	Travelling ..		5·4	5·4	4·2	3·9	2·9	3·8	5·5	5·2	5·2	6·0	7·3	6·4	5·1
Total Time			26·0	24·3	24·4	20·4	14·9	25·1	28·6	27·2	23·6	28·7	30·5	31·8	25·4

* Figures for this month refer to two weeks in April, 1953, and two in April, 1954.

TABLE II

TIME SPENT (MIN.) IN CONTACT WITH PATIENTS DURING ONE YEAR

Sex	Male							Female						
Age Group (yrs)	Under 5	5–14	15–29	30–44	45–64	65 and over	All Age Groups	Under 5	5–14	15–29	30–44	45–64	65 and over	All Age Groups
Total Time (min)	3,771	3,602	4,167	5,791	6,362	5,567	29,260	3,263	3,909	6,052	7,980	8,059	4,926	34,189
Number of Patients on List	195	328	356	462	375	182	1,898	170	267	446	500	550	368	2,301
Mean Time per Patient on List	19·3	11·0	11·7	12·5	17·0	30·6	15·4	19·2	14·6	13·6	16·0	14·7	13·4	14·9
Number of Patients Seen*	179	236	242	315	272	147	1,391	159	228	307	360	344	182	1,580
Mean Time per Patient Seen ..	21·1	15·3	17·2	18·4	23·4	37·9	21·0	20·5	17·1	19·7	22·2	23·4	27·1	21·6
Number of Episodes ..	393	439	384	499	461	268	2,444	342	448	559	680	617	316	2,962
Mean Number of Episodes per Patient on List	2·0	1·3	1·1	1·1	1·2	1·5	1·3	2·0	1·7	1·3	1·4	1·2	0·9	1·3
Mean Time per Episode ..	9·6	8·2	10·8	11·6	13·8	20·8	12·0	9·5	8·7	10·8	11·7	13·1	15·6	11·5

* Patients seen more than once are entered only once

RESULTS

USE OF THE GENERAL PRACTITIONER'S TIME.—A practitioner's activities may be considered under three headings:

(*i*) contact with patients;
(*ii*) travelling between patients;
(*iii*) administration.

The last includes consolidating visits and commitments, assembling dressings and other equipment, making entries on N.H.S. record cards, telephoning and dealing with correspondence, discussing mutual professional problems with partner, and referring to past records or literature. A record was kept of the time spent on these duties each week for the first 6 months of 1952, and the mean time over the period was found to be 5 hours per week. This estimate excludes the time spent by the practitioner waiting for patients or consultants at the surgery or while on call at home. Although weekly values varied about this mean (from 2 to 7 hours), there was little variation from month to month. When the demand for patient care was heavy during a particular week, the time spent on administrative duties was reduced for that week, but was increased in the subsequent week. The time spent travelling between each visit to a patient was recorded on each day over several weeks; the mean travelling time per visit was 5·2 minutes. This figure was used to estimate the travelling time in a given period.

Monthly variations in respect of time spent in contact with patients and in travelling are shown in Table I. In calculating mean values only bank-holidays have been excluded. In all months, excluding February and March, less than 30 hours per week were spent in actual contact with patients and in travelling between them. As would be expected, August had a very low value, and the values for May and December were low compared with those for adjacent months even after allowance had

been made for bank-holidays. The maximum values for time spent on visits and in travelling between patients' homes occurred for the months in the first quarter of 1954 and in October 1953.

Over the year, the practitioner spent slightly more than 30 hours per week on all activities subsumed under the three headings specified above (20 hours per week during August and about 35 hours per week during the first 3 months of 1954).

From this point the discussion is concerned with a detailed consideration of time spent in contact with patients. It should be mentioned that the travelling time was greatest at the extremes of life, because of the relative inability of very young and very old patients to attend the surgery.

TIME SPENT ACCORDING TO AGE AND SEX OF PATIENTS.—Table II relates time spent during the year to the number of patients at risk, the number of patients seen, and the number of episodes of illness. The mean time per episode is a measure of the seriousness of the illness, and the mean number of episodes per patient is a measure of the prevalence of illnesses seen by the practitioner.

Most children under 5 years of age were seen at some time during the year, and, in relation to the number of patients, experienced more episodes of illness than any other age-group, but the time per episode was relatively short. The time spent per patient was greatest for males aged 65 and over and lowest for females aged 65 and over. The mean time per patient seen was greatest for both sexes in this age-group.

Crawford (1954) and Pinsent (personal communication) also found that the number of spells of illness per male patient increased at late ages, whereas female rates showed little change or declined. Similar results were obtained in the present inquiry for St. Joseph's Home for the Aged.

TIME SPENT ACCORDING TO NATURE OF ILLNESS.—It has previously been mentioned that illnesses have been classified jointly by system most affected and type of lesion. In Table III, only those systems and types of lesion are shown which contributed more than 1 per cent. to the total number of episodes, regardless of sex. The Table shows the proportionate contribution of various diagnostic categories to the total time. Infective and inflammatory lesions of the respiratory system, and ear, nose and throat accounted for more than one-fifth of the practitioner's time. The relatively high proportion attributable to infections of skin and connective tissue were due largely to an epidemic of impetigo. Infective and inflammatory lesions of all systems combined accounted for more than one-third of the total time. Degenerative lesions of the cardio-vascular system and psychogenic disorders of the nervous system contributed more than 5 per cent. to the total time spent in contact with patients.

We now consider time spent in relation to the number of episodes of illness (Table III). Although the mean time spent on male episodes was almost identical with that spent on female episodes, there were several sex differences among individual diagnostic groups. The care of a male episode referable to the cardio-vascular system took half as much time again as did the care of a female episode, and there was an even greater difference between the sexes for degenerative lesions of this system (a contributory factor to the sex differences in time spent

TABLE III

USE OF TIME DURING ONE YEAR ACCORDING TO TYPE OF ILLNESS

Diagnostic Category	Total Time Spent (per cent.)	Mean Time per Episode (min.)	
		Male	Female
Respiratory	16·3	13·8	11·6
Infective and Inflammatory	11·7	11·3	9·8
Other	4·6	28·1	24·1
Skeletal	8·2	9·0	9·8
Traumatic	3·6	8·2	7·6
Degenerative	1·3	11·6	7·9
Other	3·3	9·8	13·9
Cardio-Vascular	7·0	33·5	21·0
Degenerative	5·8	40·3	23·6
Other	1·2	17·0	14·5
Nervous	11·6	14·3	10·4
Degenerative	2·3	15·7	7·2
Psychogenic	5·9	14·0	11·2
Other	3·4	13·7	11·0
Genito-Urinary	10·2	25·0	25·0
Infective and Inflammatory	1·9	(22·0)*	17·3
Metabolic and Nutritional	5·1	–	33·7
Other	3·2	26·5	17·9
Gastro-Intestinal	12·8	15·1	12·4
Infective and Inflammatory	4·3	9·9	11·6
Degenerative	3·4	24·5	19·9
Psychogenic	0·9	9·2	7·0
Other	4·2	16·8	14·3
Ear, Nose and Throat	11·4	8·6	7·5
Infective and Inflammatory	9·1	8·2	7·5
Metabolic and Nutritional	0·9	5·7	6·3
Other	1·4	18·8	8·3
Skin and Connective Tissues	13·2	8·2	8·5
Traumatic	1·8	7·1	8·8
Infective and Inflammatory	5·5	7·4	7·1
Allergic	1·9	8·7	7·8
Other	4·0	10·7	11·8
Whole Body	6·3	10·1	9·7
Infective and Inflammatory	2·1	10·2	8·4
Metabolic and Nutritional	1·0	(8·5)*	9·7
Other	3·2	13·1	10·7
Other Systems	3·0	10·3	20·0
All Categories	100·0 (63,449)	12·0	11·5

* Figures in brackets are based on less than twenty episodes

on patients aged 65 years and over). Degenerative lesions of the gastro-intestinal system and of the nervous system also gave rise to sex differences; the higher male values were mainly due to larger numbers of male patients with peptic ulceration and with serious illnesses of the nervous system. High values for lesions of the respiratory system, other than infective and inflammatory, are explained by the inclusion of a small number of patients with neoplasms. This is also true of the genito-urinary and gastro-intestinal systems. The highest mean time spent on female episodes was referable to pregnancy and its complications.

Summary

1. An examination has been made of the time spent by a general practitioner during a 12 month period in the care of 4,200 National Health Service patients.

2. Slightly more than 30 hours per week were spent in contact with patients, on travelling between them, and on administration. Monthly values ranged from 20 hours per week during August (1953) to 35 hours per week during February and March (1954).

3. Time spent in contact with patients has been related to the number of patients at risk, number of patients seen, and number of episodes of illness. Rates are given by sex and age group; those referable to male patients aged 65 years and over were outstandingly high.

4. The proportionate contribution of various diagnostic categories to the total time is shown. Infective and inflammatory conditions accounted for more than one-third. In relation to the number of episodes of illness, there were several sex differences among diagnostic groups.

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